PMI

PHOTO METHODS FOR INDUSTRY

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1961
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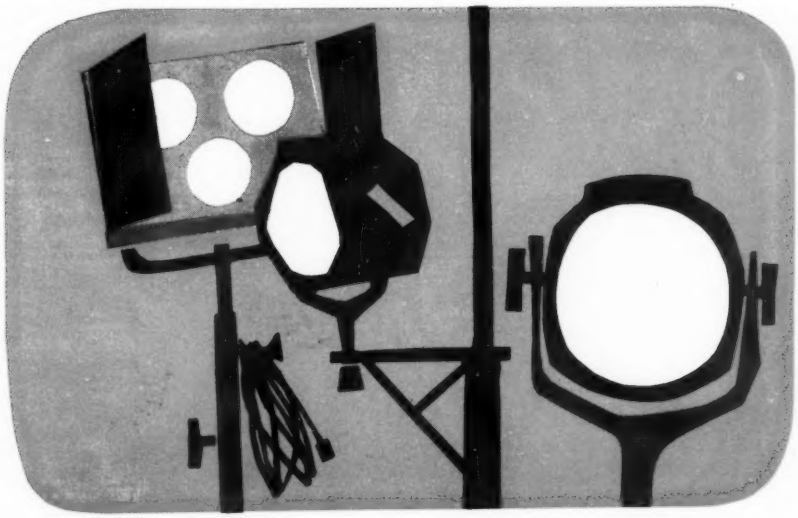

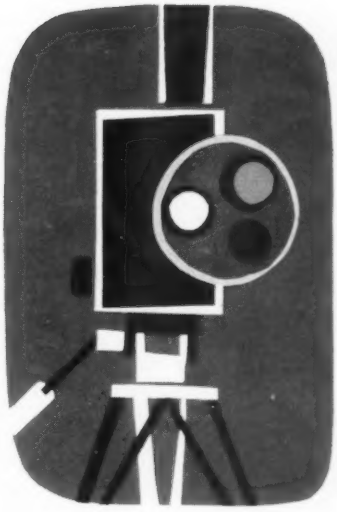

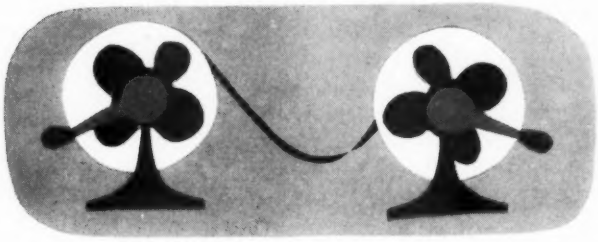

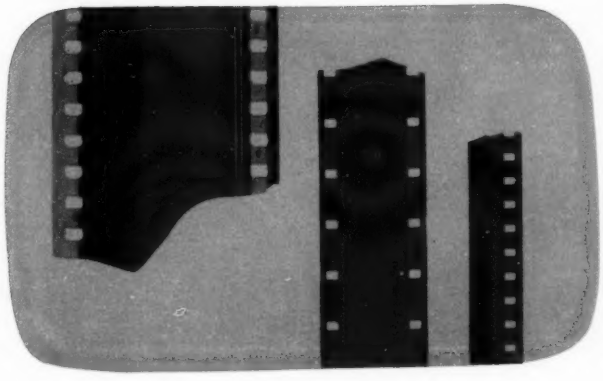

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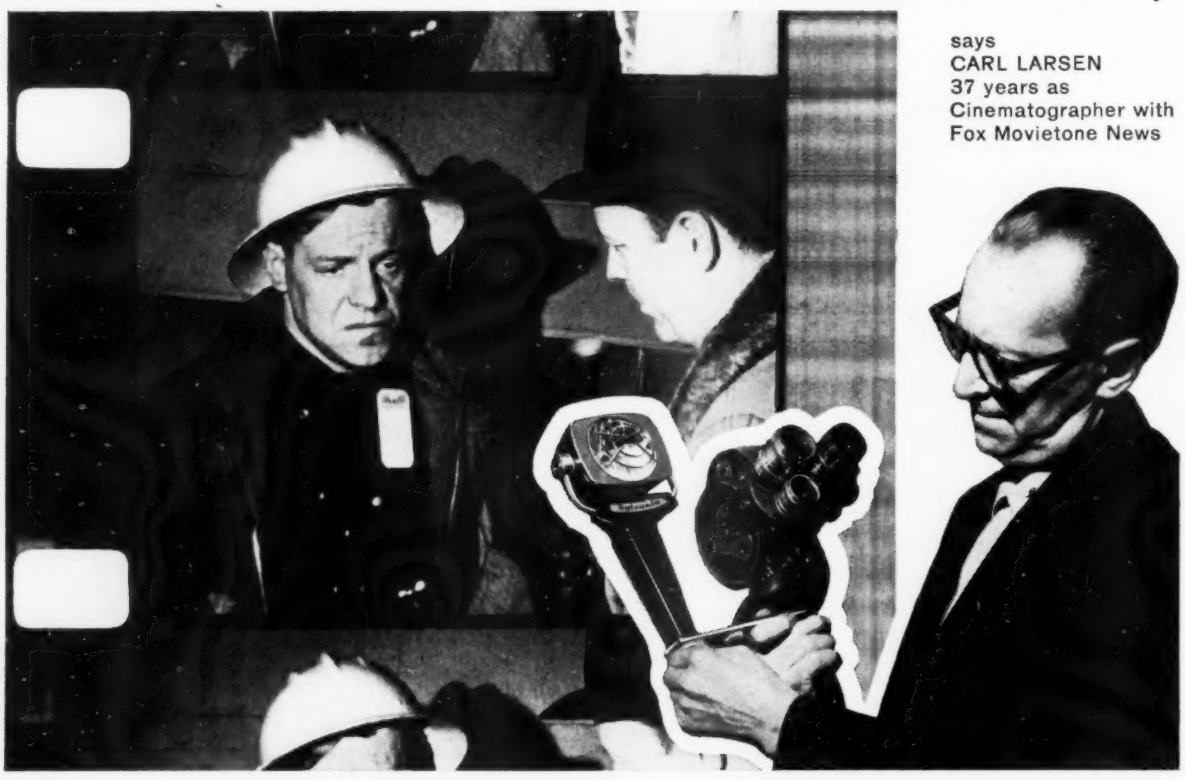

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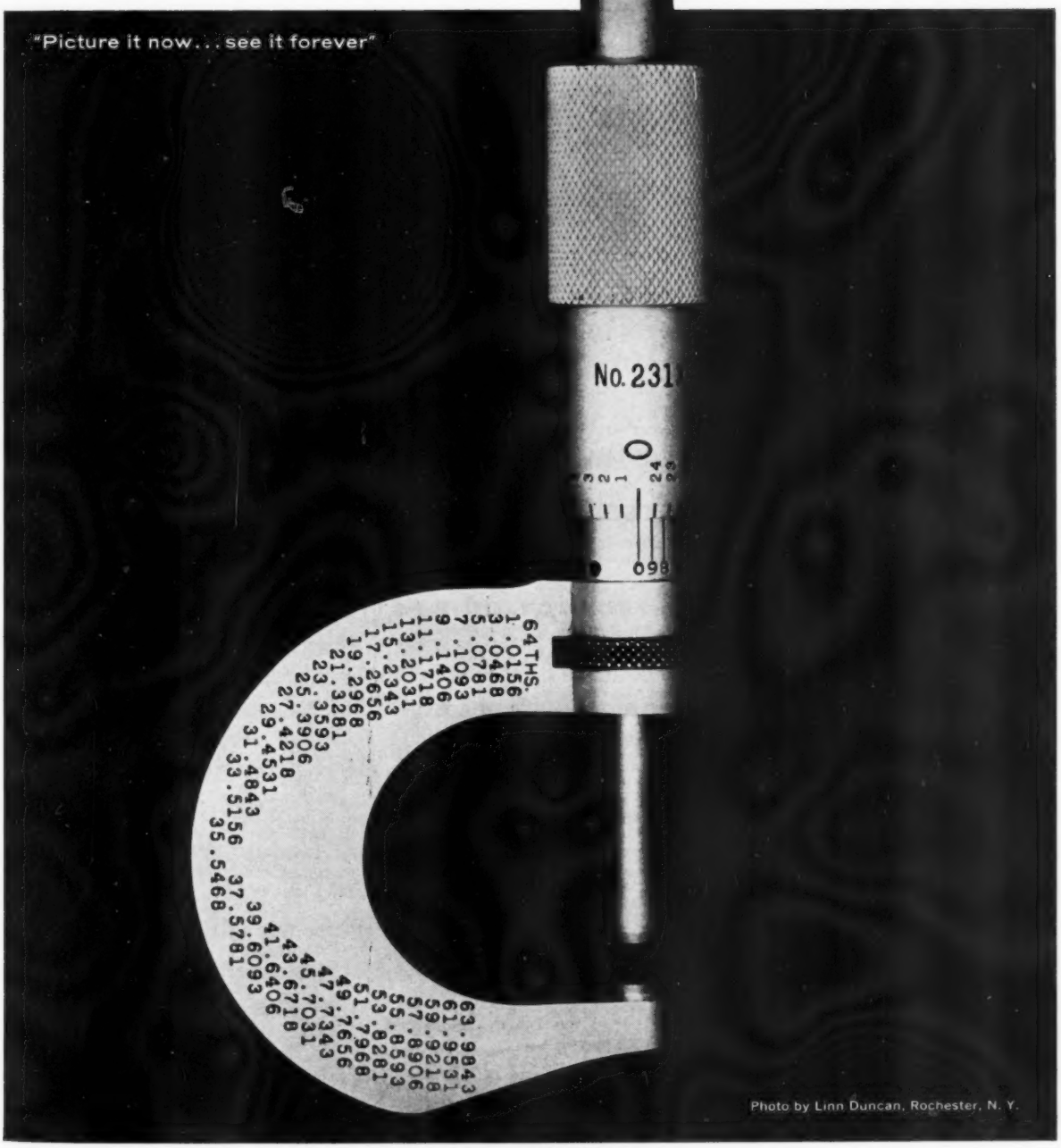

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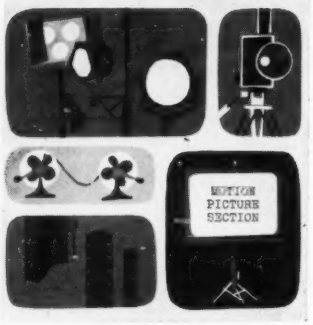

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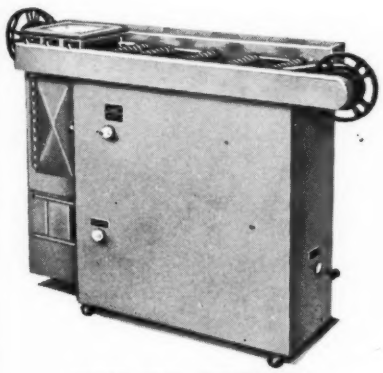

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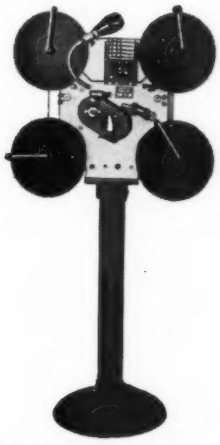

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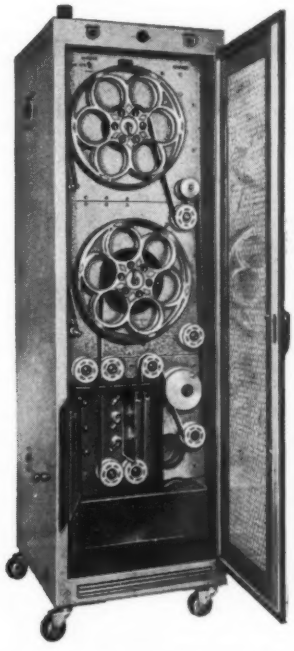

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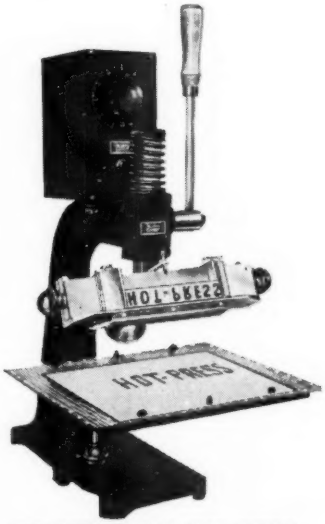

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Why The Big Switch To Single-Lens Reflex?

There are those who believe that the rangefinder 35 might never have seen the 'light of day', had the modern, automatic single-lens reflex been available some thirty years ago. It is not too difficult to understand the growing preference for the reflex. But, it might be a mistake to underestimate the importance of the rangefinder in the development of the 35mm camera.

How It All Began

Through-the-lens viewing and focusing are as old as photography itself. The early camera was equipped with a ground glass back panel on which the photographer focused and composed his picture. The image was upside-down. When ready to shoot, he inserted a plate or film holder, and made his exposure. With the camera on a tripod, and the subject fairly motionless, the exposed image was the same as the one on the ground glass.

This camera was virtually useless for hand-held shooting, and totally unsuitable for moving objects. And so it was equipped with a separate viewfinder and a calibrated focusing scale to permit the user to estimate lens focus, and to compose the picture without using the ground-glass image.

The Early Reflex

The desirability of through-the-lens viewing and focusing still remained, and efforts were continued to overcome the limitations of the ground glass back. A mirror was interposed between the rear of the lens and the film plane at an angle of 45 degrees. The lens-formed image was reflected onto a ground glass screen at the *top* of the camera, where it could be viewed and focused. When the shutter was released, the mirror flipped up, out of the lens-to-film path, and the exposure was made.

This was the first reflex camera. It became quite popular. But, it still presented certain problems. Having focused with the lens wide open, the diaphragm had then to be set for the exposure. And this was necessarily time consuming.

There were other disadvantages. The reversed left-to-right image made it extremely difficult to follow moving objects. And because the viewing image disappeared during the exposure, the user was deprived of the sense of 'follow-through'—the sense of knowing exactly what the image looks like *during* the exposure.

The Twin-Lens Reflex

The twin-lens reflex was a major attempt to cope with these limitations. The separate viewing lens was always wide open, regardless of 'taking' lens aperture. And so, there was no blackout and no need to continually adjust the aperture. But, essentially, the twin-lens reflex abandoned the idea of viewing and focusing through the *taking* lens, and incurred the additional problem of parallax between the two lenses.

35mm Photography

Meanwhile, important strides were also being made in the design of 'separate-finder' cameras. The compact 35 was a major development. Another, and probably the most important, was the rangefinder, and ultimately, its mechanical coupling to the lens. For, without the coupled rangefinder, the 35mm camera might never have achieved its present popularity.

The 35 brought a new technique to photography in which camera responsiveness, versatility, handling speed and ease became paramount requirements. Lens interchangeability became a desirable and even essential feature. But, this also created a finder problem. There was too much time lost interchanging finders, and shifting the eye from rangefinder to viewfinder.

The Combined Range-Viewfinder

A marked improvement was brought about by combining the rangefinder and viewfinder through one eyepiece. But, separate finders were still required when using other-than-the-normal lens. Efforts to include many frame lines to serve many lenses were quite unsuccessful because the finder field appeared too small, and it was difficult to use more than a few added frames. Attention was then directed to increasing finder magnification.

The Nikon SP

The high point came with the introduction of the Nikon SP—an advanced rangefinder-coupled 35 with a *life-size* finder system, and with facilities for viewing six different focal length lenses—28 to 135mm. The Nikon SP was a major advance in rangefinder 35 design. Meanwhile, equally important progress was also being made in the single-lens reflex.

The Pre-Set Diaphragm

One of the very first developments was the manual, pre-set diaphragm. After focusing with the lens wide open, the diaphragm would be turned by hand, and it would stop at the aperture previously selected for the exposure. The next improvement came when the pre-set diaphragm was mechanized, so that it stopped down automatically as the shutter was released.

But, the image still blacked out in the finder. The diaphragm had still to be re-opened for the next picture. Through-the-lens reflex viewing and focusing were still a long way from the ideal demanded for the fast handling technique of 35mm photography.

The Nikon F Automatic Reflex

In June 1959, the Nikon F automatic reflex appeared upon the scene. In one giant stride, it advanced reflex design by 25 years. Here, for the first time, was a fully automatic single-lens reflex, embodying every known advantage of through-the-lens viewing and focusing without any of the disadvantages – and with a handling ease and versatility that only a 35 can achieve.

Automatic Diaphragm and Automatic Mirror

The automatic diaphragm system of the Nikon F not only stops the lens down for the exposure, but thereafter—instantly, automatically—reopens it to full aperture in readiness for the next picture. The mirror, too, is automatic. It instantly returns to viewing position at the end of the exposure. Were it not for an almost imperceptible flutter in the finder, and the hushed 'click' of the shutter, it would be hard to tell when an exposure has been made. The image never seems to disappear. It is always visible in the finder—bright, clear and sharp.

Get more information. Circle 499, page 73

ARTHUR RICKERBY ON ASSIGNMENT

Handling Speed and Ease

The Nikon F exemplifies the single-lens reflex in its most advanced state. Its automatic operation endows it with an almost incredible handling speed and ease. It responds smoothly, effortlessly. There is nothing to distract the user—nothing to divert him from the creative effort. And he feels a sense of greater command over every picture situation—a sense of power in the almost unbounded versatility of the instrument in his hands.

Lens Interchangeability

With the Nikon F, the user can interchange lenses with complete freedom. There are 19 Nikkor lenses to choose from. No finders are necessary. The image on the viewing screen is formed by the same lens that records the image on the film. There is no parallax, and not the slightest variance between the image seen in the screen area and the image recorded on the film.

Nikon F lens interchangeability assumes an even greater significance with the availability of three Auto-Nikkor zoom lenses. One zoom lens has a continually variable range of focal lengths from 35 through 85mm; the other, from 85 through 250mm; and the third, from 200 through 600mm. Thus equipped, there are no definable limits to the scope and versatility of the Nikon F.

Automatic Fire Power

One of the most dramatic examples of Nikon F versatility is the battery-operated Electric Motor Drive. This unique accessory fires the camera automatically. It automatically advances the film, winds and releases the shutter at varying rates—up to 3 exposures per second. So fast and smooth is the automatic mirror and diaphragm action of the Nikon F the finder image never seems to disappear from view, and it never dims.

The number of applications for the motor-equipped Nikon F is limited only by the imagination. It can be operated in-hand or remotely—manually, by radio impulse or other actuating device. It can be used for rapid sequences or time lapse studies. But, even more significant is the way the Electric Motor Drive frees the user from the mechanics of camera operation, and enables him to capture momentary action, split-second occurrences, fleeting expressions in pictures he could never have otherwise obtained.

Rangefinder or Automatic Reflex?

There is no doubt of the overwhelming trend to reflex. The reasons are self-evident. Yet if a rangefinder 35 is more compatible with the way you are accustomed to work, there is no reason for you to follow the trend. That is why Nikon makes both—the rangefinder-coupled SP and the F automatic reflex.

Examine both, for they differ only in the nature of their viewing systems. Each offers you the same meticulous quality, the same effortless handling ease, the same incomparable Nikkor optics, and the same rugged reliability. And for each there is a host of accessories to fit it for every conceivable application. Even the prices are the same: $329.50 with f2 lens, and $375 with f1.4.

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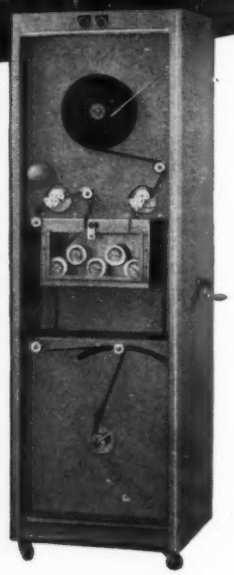

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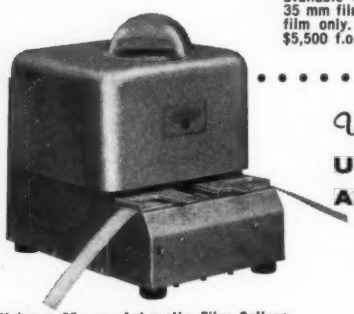

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F.Y.I.

Everyone who watches television knows that while crime may be fun for a time, it really does not pay in the long run. Among the reasons that crime pays less and less are gadgets like the recently announced Robot Burglar Trap. This is an assembly built around a Robot camera which is packed into a wall safe for installation in any handy jewelry store, bank, vault, etc. An alarm sets off the camera which takes pictures of the culprits at two frames per second. Even if the burglar gets away, the camera has a supply of pictures in intriguing poses to make the lot of the policeman slightly happier.

Spring is time for many things including the Kent State Short Course in Photojournalism. This is the 20th session of what is the oldest annual seminar of its type in the United States. Registration forms for the course, which is being held June 13 to 16, are available from Harold Van Winkle, Director, Short Course in Photojournalism, Kent State University, Kent, Ohio.

One of the best training courses in reproduction techniques is given by Ferris Institute, Grand Rapids, Mich. For details on Spring quarter enrollment, contact the Dean.

Meanwhile, up in Toronto (that's Canada, son), the Society of Motion Picture and Television Engineers will be holding their 89th Semi-Annual Convention and Exhibit. Among the papers to be delivered will be several on 8mm which will discuss the present and future of this size.

It gives us great pleasure . . .

We like to think of PMI people as reasonably authoritative. While such bragging may be immodest, the magazine and photo fields were never meant for shrinking violets anyway. Herbert P. Paschel, our man in the repro field, and an expert on what makes color, has a chapter on Color and Light in the *Book of Knowledge Annual,* 1961. After reading it (it is the best simple explanation we've ever seen), we can recommend it to all and sundry. The trick is to buy the book for your kid, then sneak a look at it on the pretense of seeing just how much this guy knows. This is what we did. You know something? He knows quite a bit.

What could possibly make a camera worth $550?

THE work you can do with it, nothing else.

The precision and resolving power, for example, that have led many studio photographers to use a Hasselblad 2¼ x 2¼ single-lens reflex instead of an 8 x 10 view camera.

The interchangeability of lenses, film backs and accessories—over 100 camera set-ups in all—that enables a professional to carry a Hasselblad instead of half his studio on location assignments.

The automatic aids that let the pro concentrate on his subject instead of the camera, and help the amateur make up in part for the intimate knowledge of light and optics that marks professional work.

Hasselblad lenses, for instance, make color and detail almost automatically perfect. These lenses have Synchro-Compur shutters and are made by Carl Zeiss of the best optical glass in the world. Resolving power—the acid test of any lens—permits greater enlargements than virtually any other lens made today.

The Hasselblad reflex system alone costs more to make than many cameras sell for. On its ground glass viewer you see a print-size preview of the quality you will get—focus, depth of field right through the lens (and no parallax). A pop-up magnifier even shows details too tiny for the naked eye.

Diaphragms of Hasselblad lenses are automatic. They remain open until you shoot, so that your view cannot get away from you. If you wish, you can also stop the diaphragm down by hand.

The EVS system synchronizes diaphragm openings to shutter speeds. You simply set your lens for a code number and your speed and aperture will be automatically aligned. You can then change to any other speed and your aperture will change with it—automatically.

Hasselblad interchangeability? You can switch from color to black and white in mid-roll, or from telephoto to wide angle, or to a sports viewer, or to a magnifying hood for shots through a microscope. You can set up for almost every shot known to photography in seconds.

What could possibly make a camera worth $550? The work you can do with it, nothing else. With Zeiss Planar f/2.8 80mm lens, $549.50.

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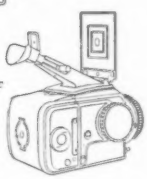
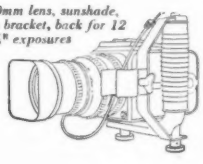
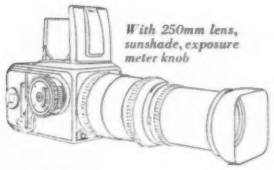


With prismatic sports finder

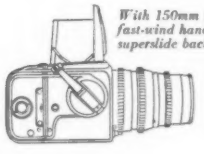


With 150mm lens, sunshade, flash gun bracket, back for 12 2¼" x 2¼" exposures



With 250mm lens, sunshade, exposure meter knob

With magnifying hood, cut film adaptor and holder



With 150mm lens, fast-wind handle, 2" x 2" superslide back

HASSELBLAD

Get more information. Circle 472, page 73

COMING UP

APRIL 12 New York Section SMPTE, Meeting, World Affairs Center Auditorium, 345 E. 46th St., N.Y.C.

APRIL 15-19 Rocky Mountain Professional Photographers Convention, Shirley Savoy Hotel, Denver, Colo.

APRIL 23 Illinois Photographers Association, Industrial Div. Conference. Pierre Marquette Hotel, Peoria, Ill.

APRIL 24-27 National Meeting of Industrial Audio-Visual Assoc., Edgewater Beach Hotel, Chicago, Ill.

APRIL 24-28 Dept. of Audio-Visual Instruction. NEA, Annual Convention. Deauville Hotel, Miami Beach, Fla.

MAY 1 Connecticut Professional Photographers Assoc. Seminar, Connecticut Light and Power Co. auditorium, Berlin, Conn.

MAY 1-5 American Society of Training Directors Conference. Bellevue Stratford Hotel, Philadelphia, Pa.

MAY 3 SPSE Meeting, 60 Hudson St., N.Y.C., 8 p.m. Subject: "Advances in Photographic Chemistry."

MAY 6 Mid-States Industrial Photographers Assoc. Seminar, YMCA, La Grange, Ill.

MAY 7-12 SMPTE Semi-annual Convention. King Edward Sheraton Hotel, Toronto, Canada.

MAY 22-26 SPSE Conference Arlington Hotel. Binghamton, N. Y.

JUNE 7 SPSE Meeting. 60 Hudson St., N.Y.C., 8 p.m. Subject: "The Gevaert Multimask System."

July 6-10 Professional Photographers of Calif., Inc., Western States Convention, Long Beach, Calif.

JULY 15-20 National Institute for A-V Selling. Indiana University, Bloomington, Ind.

JULY 22-25 National Audio-Visual Convention. Morrison Hotel, Chicago.

AUGUST 19-23 Techniques of High-Speed Photography Seminar. Directed by Prof. Harold E. Edgerton. MIT, Cambridge, Mass.

AUGUST 21-24 Biological Photographic Association Annual Meeting. Pick-Congress Hotel, Chicago.

MONTHLY MEETINGS

Association of Federal Photograhpers Meetings every third Wednesday at 8 p.m. G.S.A. Building, 7th and D Sts., S.W., Washington, D. C.

Binghamton Chapter SPSE Meetings every third Tuesday. Contact H. G. Morse, Ansco, Binghamton, N. Y. RA 2-4221, Ext. 573.

Boston Chatper SPSE Contact John Taylor, Itek Corp., 700 Commonwealth Ave., Boston, Mass., CO 7-5210.

Industrial Photographers of America Essex House, Newark, N. J. Meetings every second and fourth Thursday. Contact Tom Holbarton, 181 Lake Drive West, Packanack Lake, Wayne, N. J. or R. Handley, The Port of New York Authority, 111 8th Ave., N.Y.C.

(continued on page 13)

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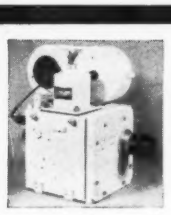

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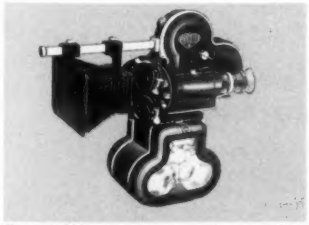

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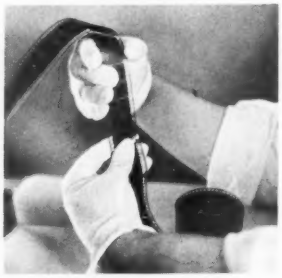

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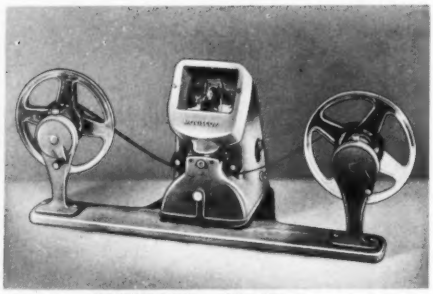

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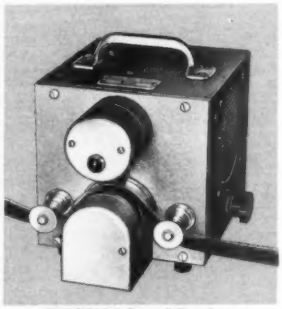

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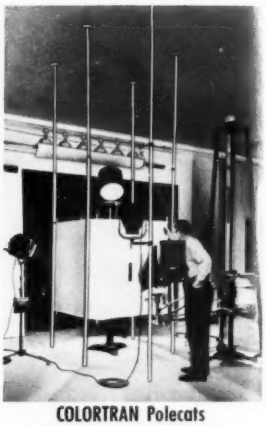

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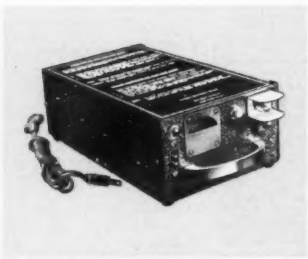

New CECO Portable Power Supply for Auricon Cine-Voice Camera

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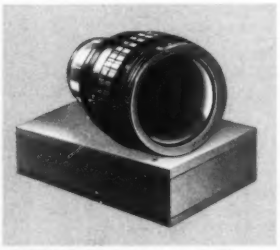

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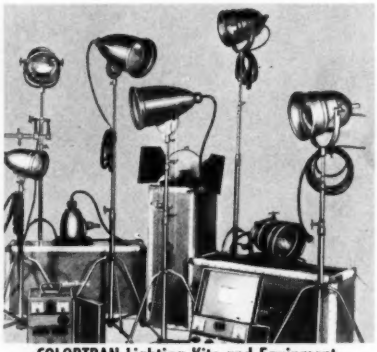

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COMING UP

(*continued from page* 10)

Chicago Chapter Biological Photographic Asso. Meetings every third Tuesday. Contact Dorothy Pinkham, 551 W. Grant Pl., Chicago. DI 8-6400.

Cleveland Chapter SPSE Meetings the first Tuesday of each month. Cleveland Engineering & Scientific Center, 3100 Chester Ave., Cleveland, Ohio. Contact Robert E. Birr, General Electric, Nela Park, Cleveland. GL 1-6600.

Manhattan Chapter Society of Reproduction Engineers Meetings every third Monday. Contact J. Ryerson, Joseph Dixon Crucible Co., Newark 2, N. J. DE 3-3000.

Midwest Industrial Photographers' Association Contact John E. Schrage, c/o Deere & Co., Photo Department, 3300 River Drive, Moline, Ill.

National Visual Presentation Association, Inc. New York City. Meetings every second Thursday. Contact M. E. Shack, 19 W. 4th Street, New York, N. Y. MU 2-2294.

New York Chapter SPIE Meetings every third Thursday. Contact Don Bass, P.O. Box 177, Bethpage, L. I., N. Y. Liggett 4-8196.

New York City Chapter SMPTE Meetings first or second Wednesday of each month. Contact Ed Warnecke, Eastman Kodak Co., 342 Madison Ave., New York, N .Y. MU 7-7080.

Rochester Chapter SPSE Second Thursday. Contact Woodlief Thomas, Jr. Color Technology Division, Building 65, Kodak Park, Rochester 4, N. Y. CO 6-2500.

Rocky Mountain Industrial Photographers Meetings every Fourth Monday. Contact P. H. Broadie, 2170 S. Lincoln, Denver 10, Colo. PEarl 3-2200.

Southern California Chapter, Biological Photographic Assn. Meetings every third Thursday. Contact Avis Gregersen Warner, Box 78, 1200 N. State St.. Los Angeles 33, Calif. CA 5-3131 ext. 7-1319.

Southern California Chapter SPSE Meetings the last Monday of each month. Contact Ben Augustine, 235 Annandale Rd., Pasadena 2, Calif. Telephone MU 1-0076.

Southern California Chapter Industrial Photographers Meetings every third Tuesday. Contact Janet Marshell, Executive Secretary, 5463 Virginia Ave., Los Angeles 29, Calif. HO 5-6614.

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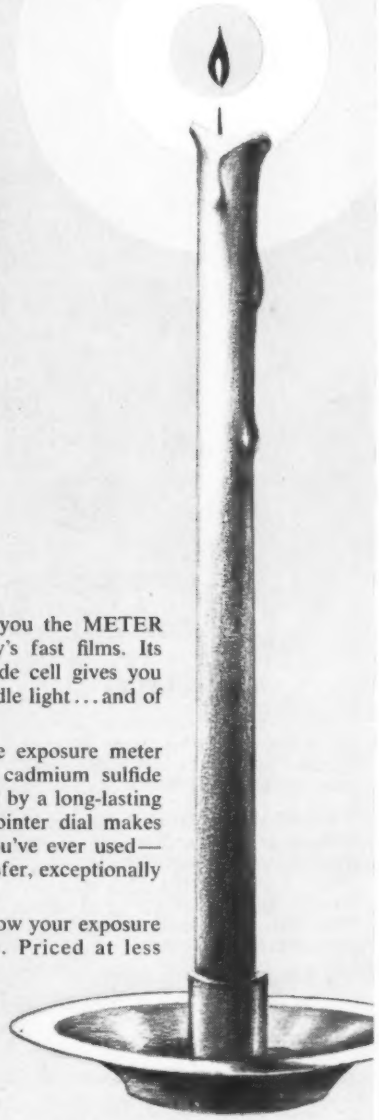

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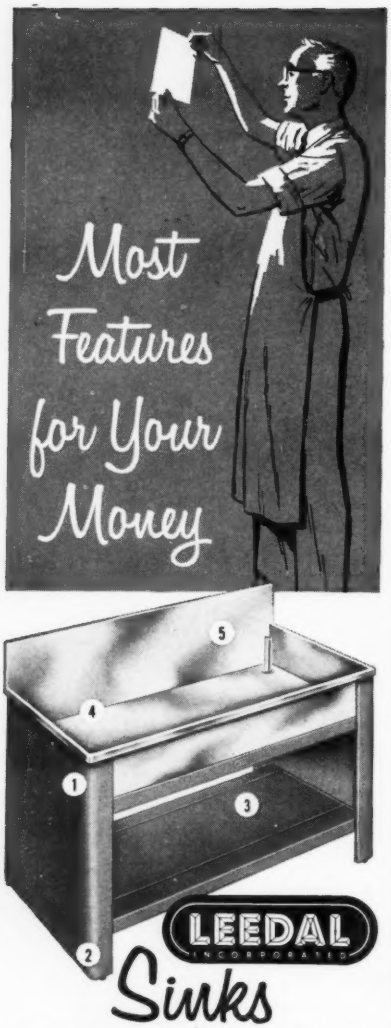

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David B. Eisendrath, Jr.

WORKING PHOTOGRAPHER

Some comments on amateur cameras and their use in industry

In the January issue of PMI, our respected editors ran an editorial commenting on the battle of the in-company photographer in proving that there is a difference between an amateur and a pro. Also, says the editorial, the pro must prove that he is a pro; and thirdly, the in-company photographer must prove that truly professional pictures have a value that snapshots do not.

Although this striving for recognition is certainly extant, and in many cases needed, I must hastily come to the defense of the snapshot. I do not mean the *amateur* picture, I do mean the picture made with the amateur camera. I am a firm believer in the use of cameras of *all* sorts to round out our field, if our field is to be—as I believe it should—a complete field of communication.

I am an idealist, perhaps, but I believe that the quickest way to management's heart is through its pocketbook. And when we practice what I call "foot-in-the-door photography," which is the simple proof of money-saving and money-making uses of photography, the result is always a strong argument for the value of photography in serving management. As long as you are shocked and have begun to roll up your sleeves, let me add:

I am a strong believer in the use of box cameras, automatic cameras, Polaroid cameras and the like in the hands of non-photographers. *But, I believe that there must be a photographer behind every camera.* Not standing *that* close perhaps, but directing it, surely.

Polaroid lands a job

Our friends at a large automobile manufacturing company report that they have taught freight dock supervisors to use the Polaroid cameras for photographing freight car damage to incoming materials. You may say they are doing a photographer out of a job, but I contend they are not. Any photographer who would spend his days waiting to photograph such trivia isn't worthy of the title of industrial photographer. Nor can the photo department, scheduled for efficient and economical coverage of many types of assignments, have a photographer on call like the fire department or ambulance waiting for the unexpected to break. But when the freight dock foreman steps back two big steps for his 6-ft. shot (three steps and a shuffle for a 10-footer) and raises the Polaroid camera to his eye, he is making a record that is instantly available, serves as positive evidence, and allows for prompt unloading with no hold-up of production or demurrage charges.

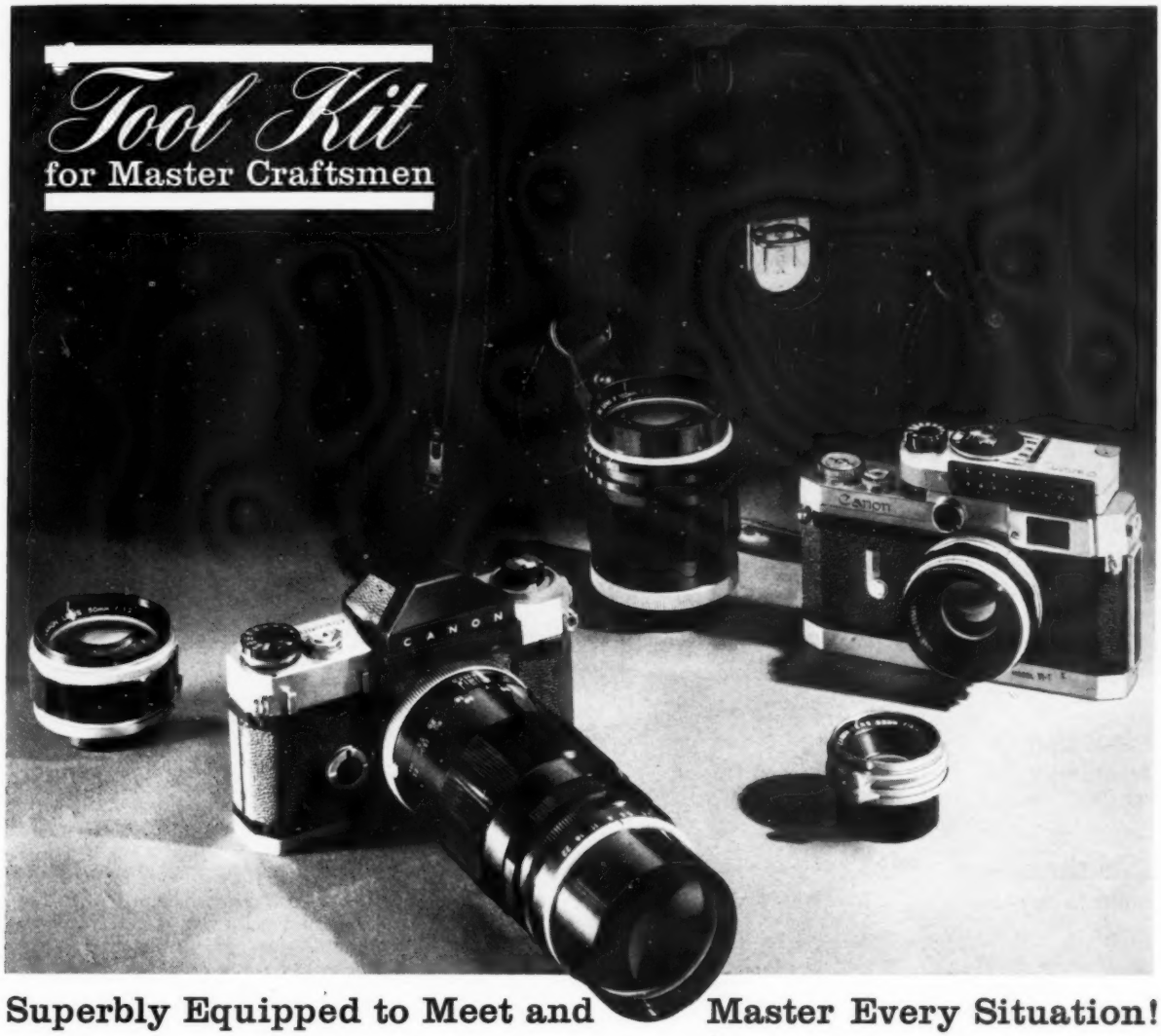
More important, they realize that they are in no way acting as a photographer and the results can not compare with a shot made by a professional on professional equipment. But they have saved money and served a purpose. Industrial photography is *purposeful photography,* remember?

Cheesecake pictures?

Dick Kinstler at Procter and Gamble has rigged up a permanent, fixed-focus set-up with a camera and lights to make pictures of cakes baked in the test kitchen. The dietitian can push the button, Dick's lab will process and supply film. Doing a photographer out of a job? Anyone who'd sit by all day to push the button of an automatic camera doesn't deserve to call himself a photographer. Kinstler says, "Send a camera instead of a photographer." Please note carefully, however, that a photographer conceived the idea, set up the equipment and directs the project.

Believing that one must prove the economics of functional photography, I talk to management groups and show them a box cam-

(*continued from page* 16)



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Much has been said for Canon . . . in the press . . . by the working photographer . . . but none has capped Canon's unique quality as well as the world-renowned photo/journalist who walked into our offices the other day to look at some of our latest lenses to add to his "tool kit". His simple, unquestioning appreciation of the fine tools of his craft was perhaps the most eloquent testimonial for the Canon System of Photography.

Browsing through his kit, we noted his choice of Canon lenses. For his Canonflex, the unique combination of 50mm f1.8, 100mm f2.0 and 200mm f3.5 was chosen for its orderly progression. Each with precisely double the magnification, half the viewing angle of the next shorter focal length lens, each with automatic diaphragm and positive seating bayonet lock-mount. Each boasts the fastest speed available in each focal length and Canon's color-balancing Spectra-coating. For his trigger-action rangefinder model VI, the exciting, extraordinarily sharp 35mm f1.5, and the extreme wide angle 25mm f3.5. These basic tools, supplemented by a choice of additional Canon lenses to 1000mm, produce the sparkling pictures appearing in every issue of his leading picture magazine!

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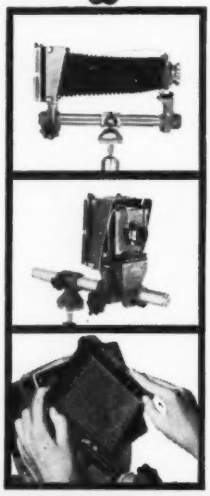

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WORKING PHOTOGRAPHER

(*continued from page* 14)

era. A simple, inexpensive plastic affair with a flashgun firmly locked in place. On the back of the camera, on wide adhesive tape is typed "To make picture 1. Look here (*a red arrow leads to the finder*). 2. Push this button until it clicks (*another arrow to release*). Hold camera steady. 3. Wind this knob (*ditto with the arrow bit*) until a new number appears here (*and another arrow to the red window*)."

This, I explain, is a truck-driver camera. Anyone who can read can make a never-fail picture with it. Truck drivers are literate types, besides they have to read to pass a driver's license test. The first time a truck driver is in an accident he can walk away from, and if he can make pictures of the skid marks, the road conditions, the hazards of the terrain and so on—he may well help establish a good insurance claim.

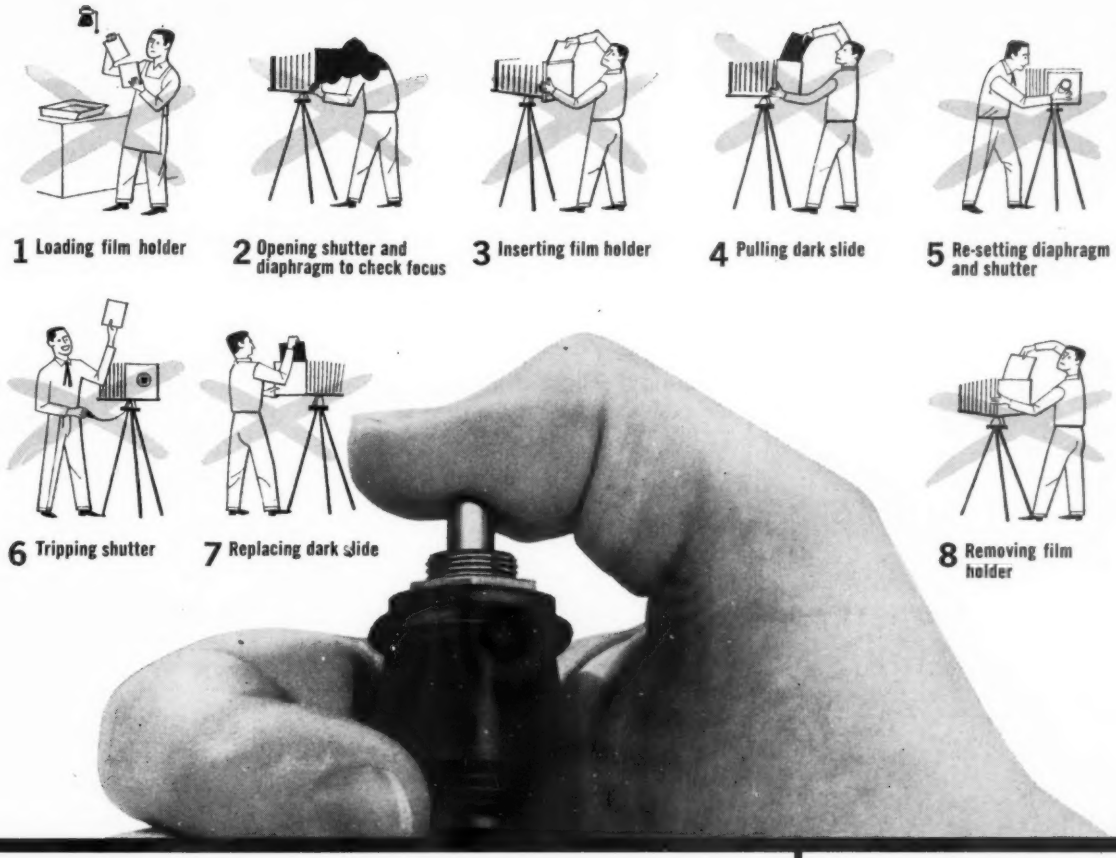
One trucking company recently won a national safety award for its improved safety record. They attributed much of it to safety awareness and the fact that all trucks were regularly equipped with simple box cameras. Every time a truck or trailer was loaded and the driver felt that it was improperly packed or shored, he made a picture of it for evidence in case of a load shift. Fragile instruments were photoed as they were cased to show that they had approved packing. In each case an *amateur* was making a picture with an *amateur* camera. But the pictures, although not professional, were purposeful, useful and money saving. They were industrial photographs in my book.

The clincher is the fact that the management involved here is so sold on photography, so aware of the potential of photography to record, measure, remember and serve industry that they use photography in every way that they can and have a rapidly expanding industrial photo department.

Indispensable tool

The January issue of the *National Photographer*, magazine of the P.P. of A. (the Industrial Division is well represented in it) carries a talk made in England at the Institute of British Photographers in London by Sir Miles Thomas, Chairman of Monsanto. Sir Miles said that the camera was the herald of humanity and had become one of the most powerful tools ever developed for the advancement of human under-

(*continued on page* 20)


1 Loading film holder
2 Opening shutter and diaphragm to check focus
3 Inserting film holder
4 Pulling dark slide
5 Re-setting diaphragm and shutter
6 Tripping shutter
7 Replacing dark slide
8 Removing film holder

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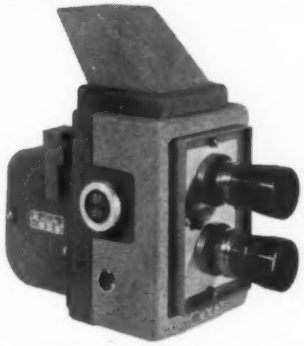

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Get more information. Circle 402, page 73

Lloyd E. Varden

PHOTO METHODS FOR TOMORROW

Special high-resolution camera for resolving power tests

According to a report in *The National Micro-News*, No. 49, pp. 128-133, Mr. C. S. McCamy has designed a camera at the National Bureau of Standards capable of projecting a parallel line pattern of 50,000 lines per inch. It is hoped that this research camera will help in establishing a standard method for determining the resolving power of photographic materials.

A standard method for measuring resolution does not exist at present despite the many published figures one sees on film resolution. But a committee of the American Standards Association is attempting to correct the situation in collaboration with five laboratories in the United States and Canada, of which the NBS photo research lab is one.

There are many factors that influence the resolution of a film. To pin down those which must be specified so that all resolution tests on the same emulsion will yield the same result is not a simple matter. But, it is known that the true resolution of an emulsion (under specified conditions) cannot be determined unless the test equipment can produce a line pattern much finer than the emulsion can resolve. The capability of the NBS camera to resolve 50,000 lines per inch was tested on spectrographic plates of extremely high resolution.

Optical system

The optical system of the camera consists essentially of a high precision apochromatic microscope system used in reverse to make a very small image of a large target. Two different objectives are now employed interchangeably. One is an 8mm lens with a numerical aperture of 0.65 (equivalent to f/0.77) and the other is a 16mm lens with a numerical aperture of 0.30 (equivalent to f/1.66). The elements of these objectives were respaced for this particular application and the interiors of the mounts were specially blackened to minimize undesirable reflections.

Film or plate emulsions to be tested are placed against a surface attached to the objective lens mount by a fine screw thread, with a gear mechanism permitting minute focus adjustments. Films are held to the plate by a miniature vacuum back. The target is first focused visually through a microscope, but the best focus is found by making a series of exposures at slightly different focus positions. The optimum focus position is so critical that the camera is operated under constant temperature to avoid thermal expansion or contraction effects.

Illumination

Even illumination of the target is obtained by a compensator plate between the lamp and the condenser of the illumination system. The compensator is a glass sheet having a circular pattern printed on it which is heavier in the central area than at the edges. The intensity and spectral characteristics of the illumination can be varied by inserting neutral density or color correction filters above the condenser lens.

Mechanical vibration, which could easily blur the image, was eliminated by encasing all components in a massive steel cylinder and then suspending the cylinder from the ceiling with springs. The natural frequency of the springs was chosen to have a value that would mechanically insulate the camera from the vibration frequencies of the building.

To illustrate the resolution capacity of the new camera, Mr. Bernard Fouquet of NBS photo research laboratory made a photocopy of the first page of the Bible at a linear reduction of 1000, thus reducing

(*continued on page* 20)

Official U. S. Navy Photograph

Even Antarctic Weather Can't Stop SUPER SPEED GRAPHIC* and GRAFLITE*

Super Speed Graphics have been performing dependable photographic service for Operation Deepfreeze in Antarctica. In the photo above, for instance, Ensign C. J. Haggerty is shown photographing operations of the Navy's C-130 ski-equipped, 4-engine, turbo-prop, heavy duty transports. The photo illustrates the difficulties encountered in subzero photography . . . and why camera, shutter and flash must operate consistently and conveniently in spite of cold, blizzards and heavy, cold weather clothing.

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For full information on the Super Speed Graphic with Graflex 1000 Shutter and other Graflex-made equipment, see your Graflex dealer. Or, write Dept. PMI-41, Graflex, Inc., Rochester 3, N. Y. In Canada: Graflex of Canada Limited, 47 Simcoe Street, Toronto 1, Ontario.

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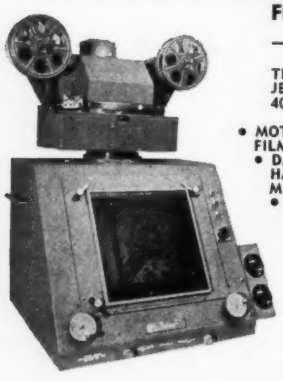

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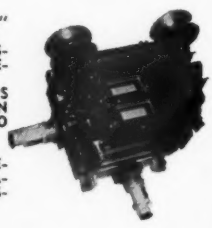

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WORKING PHOTOGRAPHER

(*continued from page* 16)

standing; and certainly one of the vital tools of industry. . . . Bully!

He went on to say two things, however, that bear some consideration. He talked about the increased usage of automatic cameras and automatic picture-taking devices and asks whether this will be the carrier of a deadly disease. Will the photographer find his personal creativity insidiously eaten away? Will the skilled photographer become the victim of automation? Sir Miles went on to say that he felt creative thinking and imagination seemed to be diminishing in the photographic profession and was being replaced by a technical competence that was soulless.

This is a shattering idea. I do not believe, however that any skilled industrial photographer will ever be replaced by automation or automatic cameras. I am sure that some button-pushers may be replaced by truck drivers with box cameras, but not one *real* industrial photographer. They will be directing the automatic and box camera photography . . . and being creative.

Creative? Yes, indeed. But I feel that the future of professional industrial photographers lies not only in the creativity of interesting and thought-provoking pictures, but also in the creativity of discovering new uses for photography. This is where the future of our profession will be and it is where we can broaden our horizons.

When industrial photographers can sell photography as a useful, practical, economical tool that they can direct and manipulate, they will not have to be afraid of being replaced by automatons or amateurs with amateur equipment. Instead, they'll establish their professionalism by making use of photography on every level.—THE END

METHODS FOR TOMORROW

(*continued from page* 18)

the *area* of the page by a factor of one million. First he had to reduce the page 2.5 times to fit it into the chart holder of the camera; then this was reduced 400 times with the camera onto a high-resolution spectrographic plate. The image proved to be clearly legible when viewed through a microscope at a magnification of 1250X. At this reduction ratio the entire Bible could be recorded within an area of ¼ square centimeter, i.e., less than the area of Lincoln's head on a penny. —End

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Edward R. Farber

ELECTRONIC FLASH

Why be a slave to existing light? It's the final result that counts

In a recent lecture to a seminar of the American Society of Magazine Photographers, Arthur Rothstein, technical director of photography for *Look*, emphasized that "Photojournalism is wedded to the printing presses!" Though it might seem obvious that a picture is no better than its ability to reproduce in the medium for which it is intended, there are far too many photographers who judge photographs only as prints.

Thus it came to pass that this reporter got into a hassle with a number of photographers at the convention of the Wisconsin Press Photographers recently, when he was critical of certain existing light photographs. It was promptly alleged that I was quite prejudiced in favor of artificial lighting, particularly, you know what kind; that I was supporting a practice which was almost outmoded and soon would be completely passe as fast films made supplementary light unnecessary except in existing darkness or, non-available light.

Light it, dammit

This might be true if office and factory lighting equipment were designed to illuminate people, but most lighting is intended to illuminate desk tops, drawing boards, machine tools or assembly lines. Under such lighting, people usually come out second best. I am old fashioned enough to feel that a picture of someone, offered as a picture of that someone, should show that he has eyeballs—not just black patches where they ought to be. If newspaper presses cannot reproduce the subtle tones of an existing light photograph, then its up to the photographer to throw a little light on the subject. Obviously, it's not just light, but the right light in the right place that makes the picture that will reproduce.

There are many who will ridicule the photographer who carries in a great bunch of electronic flash units, sets them up as slaves, and then gets out a little 35mm camera. Somehow it does seem basically wrong. Most EF units are much too big, bulky, and cumbersome to make suitable companions for a 35mm. Many are much too bright, and the small reflectors with their sharp shadows tend to give photographs that "commercial studio look." Two helpful supplementary lighting techniques are offered here. The first and the best is not the most elegant solution since it calls for somewhat specialized equipment: a bare lamp flash unit.

Not many compact portables can be operated as bare lamp units and with many the construction of such an accessory arrangement may not be easy. Yet the results are so convincing that the *Milwaukee Journal* had staff photographer John Murray construct devices of his design for use by all members of the staff. (As you may know, the *Journal* uses 35mm almost exclusively.)

The bare lamp combines well with existing light, providing fill light, a highlight in the eyes, and a roundness by reflection from the walls or even the photographer's shirt. Used well away from the camera, the blending and balance can be skillfully accomplished to make up for deficiencies in films and printing processes.

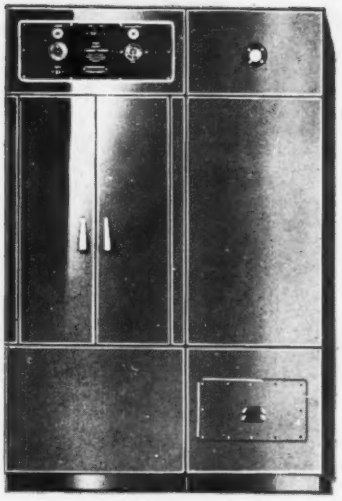
Not quite as desirable, but still

(*continued on page 24*)

Inventor John Murray at midsection with his no-reflector flash unit

filtered air drying by FISHER...

ANHYDRATOR...



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The Universal All Film Dryer (at left) dries a film load of 14,000 sq. inches in 15 minutes. Operating on a supply of filtered air and calrod type heat, the dryer is economic and efficient. Accepts (60) 14" X 17" X-Ray films or (24) 20" X 24" graphic arts films, (60) rolls of 120 film (140) sheets of 4 X 5 in., 5 X 7 in., or 8 X 10 in. film. Accepts all sizes of film from 8 mm (Minox). Dryer requires only 24" X 16" of floor space and is 82" in height.

The Fisher table top model (at right) is a tried and proven unit for use where small capacity yet fast, efficient drying is required. This unit requires only 11" X 18" of table space and is 36 inches high. Accepts (24) 4 X 5 in., (24) 5 X 7 in., (12) 8 X 10 in., (6) 14 X 17 in. or (6) 12 X 20 in. sheet films. Comes complete with one set of standard cut film racks . . . roll film racks available. For complete information on Fisher dryers write . . .

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Get more information. Circle 429, page 73

ELECTRONIC FLASH

(*continued from page 22*)

effective and simple, is the use of one of the new small self-contained, monopacks on a 10-ft. or more trip cord. This unit is then used way back or as an off-the-camera bounce unit. Here, too, white shirts can be perfect reflectors when working close to subjects.

Don't let the purists talk you into giving your photo audience poor visual information on the grounds that it is "honest" photography. Be sure that the information the viewer receives is honest, but work within the limitations of the mediums. That means supplementary lighting more often than not.

Establishing a guide

In his monthly column in the NPPA magazine, Jim Godbold of *National Geographic* and NPPA Committee on Education Chairman, reminds his readers that ASA 200 Polaroid Film is still a good basis for establishing the guide number for a new and unknown electronic flash unit—by using it to get comparable prints. Be careful to use exactly the same developing time and temperature each time, and make a good exposure with a known unit, then a number of prints with the unknown unit. When an exact match is obtained, the f-stop relationship of the two good prints from the known and unknown units will establish the new guide no.

Holdover

A recent paper by Dr. Harold Edgerton and David Cahlander of MIT, *Holdover in Xenon Flash Lamps*, explains some causes of this continuous glow that sometimes occurs in both single flash and repetitive units.

The article in the January 1961 issue of the *Journal* of the Society of Motion Picture and Television Engineers gives a formula for maximum flashing frequency for various flashtubes provided certain facts about the lamp are known and standard capacitor charging methods are to be used.

It is pointed out that in most such circuits the flashtube will discharge the capacitor to about 50 to 100 volts and then extinguish. At this point the current flowing in the flashtube is the important value. The capacitor charging current must not exceed this same value or holdover will take place.

If standard charging circuits will not provide for sufficiently rapid

(*continued on page 87*)

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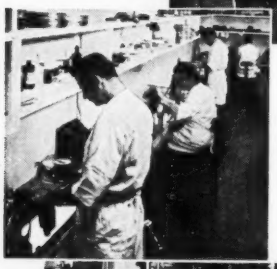

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Samuel Lang & Leonard Zoref

INDUSTRIAL COLOR

Kodachrome II, high-speed 120 reversal, Anscochrome dupe film

The first major change in Kodachrome since its inception is about to be introduced. The rapidly advanced technology in emulsions and dye improvements is finally being incorporated in Kodachrome. Although the speed has been increased, Kodak has kept it at a conservative level and seems to have stressed improved quality. It still is a far cry from the high speeds that some photographers are demanding even at a loss of quality. Kodak has priced the film slightly higher than the present Kodachrome film. There will be limited production of the film this year so that the bulk of the Kodachrome used will still be the present type. It is our opinion from the limited results we have seen so far that this film will completely replace the present type of Kodachrome. We predict that the old Kodachrome will be extinct in a couple of years.

Speed and sharpness

The Kodachrome II is 2½ times faster than the present Kodachrome. Comparative exposure indexes are:

Kodachrome II	Kodachrome (old)
Daylight ASA 25	ASA 10
Type A (3400) ASA 40	ASA 16

As with previous Kodachrome emulsions, Kodak shows no sign of manufacturing a Type "B" 3200K type. The Type "A" Kodachrome II can be used in daylight with the 85A conversion filter at ASA 25, which is the same speed as the K-II daylight type.

Probably the most unusual characteristic of this new Kodachrome is that its sharpness has been improved. This is made possible by the use of thinner emulsions. The emulsion relief image is not as strong as in the old Kodachrome. The improvement is most noticeable in 8mm due to the tremendous magnification that is required for projection. We as yet have not had sufficient time to test its ability in enlargements for prints. We will report on it in a future column.

Contrast

The film also has been noticeably improved contrast-wise with improved shadow and highlight detail. This tends to give direct flash a more even appearance. The lowered contrast has also in turn improved the exposure latitude.

The color rendition has also been greatly improved. Saturation of bright colors is much better (similar to the difference between E-1 and E-3 Ektachrome), while at the same time there is a noticeable improvement of the pastel colors. The more specific improvements are that the reds are more brilliant, greens are more saturated, and yellows are less orange.

The Kodachrome II requires different processing than regular Kodachrome. Kodak and some independent processors have already set up for it while the rest of them are in the midst of doing the same.

The film is available in the same sizes and types as the present Kodachrome with the exception of 50-ft. 16mm rolls. Kodachrome II Professional film, Type A, in the 135-36 exposure rolls will be available during the latter part of 1961. Kodak has no plans to introduce a Type F (clear flash) Kodachrome II film.

As we have stated before, this new Kodachrome appears to be so far superior in its advantages over the old Kodachrome that when supplies of the new film become plentiful we should see a quick death of the old Kodachrome.

Ansco duping films

Ansco has announced a new series of duplicating films. They are Anscochrome Type 647, a heavy base reversal sheet film designed for duplicating positive color transparencies by contact or projection, Anscochrome Type 547 in 35mm

(*continued on page* 28)

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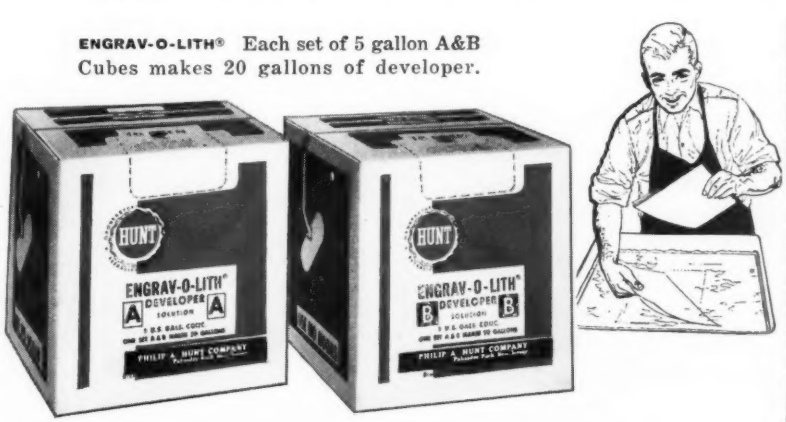

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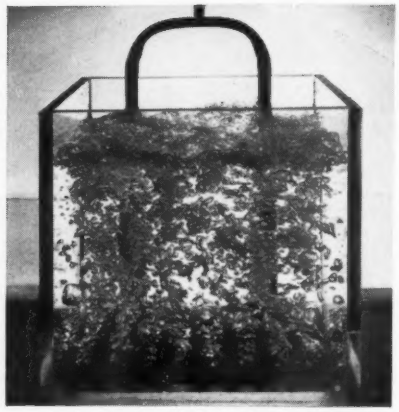
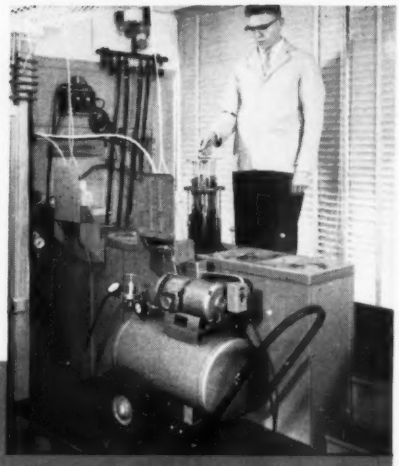
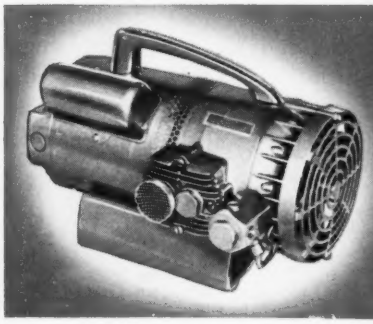




A B&G Oil-less Compressor is basic equipment in Eastman Kodak Company's Photo Finishing Sales Laboratory.



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INDUSTRIAL COLOR

(*continued from page 26*)

long rolls and Anscochrome Type 747 in 70mm long rolls.

Although we have not had an opportunity to test these films (they were announced March 12 at the Master Photo Dealers and finishers Trade Show in Philadelphia), Ansco's description is intriguing and worthy of repetition here.

All three films are fully compatible with Anscochrome processing solutions, either regular or high temperature. The only adjustment is a shorter first development (12 min. at 68F).

The curve conformity is said to permit color duplicates of extreme accuracy, to the extent that a well-made 47 series dupe is difficult to distinguish from the original.

The new film is said to exhibit improved sharpness, D-max and color saturation and cleaner highlights than previous duplicating films.

The films are balanced for a duplicating light source of 3000K. Filter recommendations for the Type 647, which are supplied with each package of film are based on tests made with a GE No. 212, Sylvania E-11 or equivalent photo-enlarger lamp.

Full details on duplicating procedure with the films are available from Ansco.

Kodak high-speed 120

The equivalent of High Speed Ektachrome in the 120 film size is available on a special order basis. Kodak's designations are Kodak Color Reversal Film, Daylight Type S0125 and Type B S0126. The speeds are 160 and 125 respectively. Minimum order is 20 rolls. Price is $1.75 per roll.

Processing (in improved E-2 solutions) requires intense reversal exposure. Instructions for accomplishing this are offered by Eastman. In reel processing they include close positioning of two reflector floods with heat absorbing glass between the lamps and the reel.—THE END

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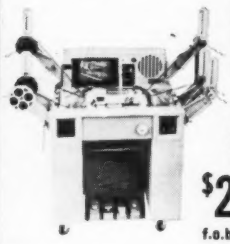

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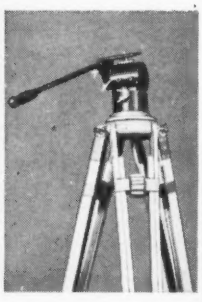

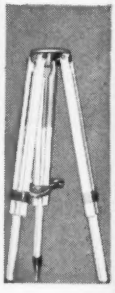

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Arnold Eagle

INDUSTRIAL MOTION PICTURES

If you want good stills, give the still photographer a chance

Film makers are usually the first to recognize the importance of still coverage during a motion picture production. Still pictures are needed for publicity, for record, for use in slide presentations, etc. Yet, in a majority of cases, still coverage is inadequate, spotty or non-existent. Despite all past experience and good intentions, planned still coverage falls by the wayside. This state of affairs exists not only in small in-plant and documentary production but in elaborate efforts with a highly-paid still man on the job.

Time and time again, I have heard director's promise a still man opportunity to make some pictures "later." Too often, he forgets or falls behind schedule (and what director is not behind schedule?) and by the time the still man is called, the set is struck and the next scenes are being shot.

A job in itself

For adequate still coverage, the still man must be relieved of all other responsibilities during the production. If he must cover other areas, he can spend only a limited time on the movie set or on location, After a few pictures of the crew and perhaps some of the setups, the cameraman's enthusiasm will wane. (Perhaps the best recipe for bad pictures is an unenthusiastic cameraman. It is his feeling for pictures and his subject that induces a cameraman to bring new vision to his work.)

Sometimes the cameraman is persistent enough to get a shooting schedule so that he can organize his time better. He then discovers, in short order, that most shooting schedules are the optimistic hopes of the director and bear little relation to reality.

Probably the worst mistake any film maker can make is to handle the movie camera and also attempt the still coverage. I must admit that this type of double job sounds reasonable and I have tried it myself. But it does not work. Either the movie or the still coverage suffers from neglect. If you are not careful, both will come to grief.

The difficulty of combining still and motion picture shooting is not solely a matter of time. The two jobs are immiscible because both demand the undivided attention of the creator. Let's go into this matter of the creative process in still photography.

This crystallized for me years ago while I was on assignment for Standard Oil, making still photographs of the Baton Rouge Refinery for an annual report. I was invited to give a talk on industrial photography for a local group. The inevitable question arose: Why would I shoot 200 4 x 5 Ektachromes on such an assignment when at best four pictures would be needed?

My response wasn't the stock one, namely, that film is cheap, and time and travel expensive, and that therefore the overshooting was a sort of insurance policy against having to come back.

Thinking with a camera

Instead, I explained that I try never to repeat a shot. Every picture should have some observable change, in position, exposure, light or action. Let us say the shot is of a man operating an intricate machine. The first exposure is what we would call the obvious shot, showing the man, the equipment and the activity in which he is engaging. The result is probably a good useful picture, but in all probability, it is not the most creative one. As I take the shot, my mind starts working. I think that a low shot may give an impression of the towering height of the machine. While I am down on the floor, on my stomach, taking the second shot, I get the idea that a bird's-eye view from above will

(continued on page 32)

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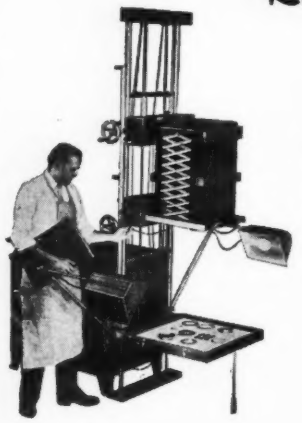

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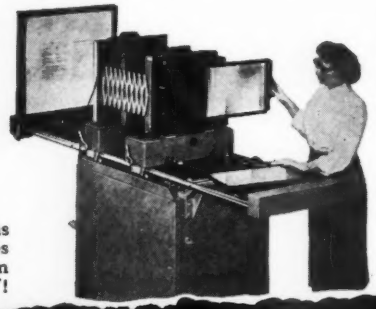

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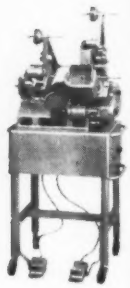

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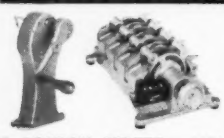

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IND. MOTION PICTURES

(continued from page 30)

give a very unusual point of view. And while I am risking life and limb on a board laid across two 14-ft. ladders, I realize that what I really need is a detail of the operation. So I complete my shot, get down, put a long lens on my camera, and concentrate on the main action of the man's hand. This is thinking with a camera.

The creative process

This is how other creative artists work. This is how a creative painter works. He may have an idea before he starts; but as he paints the work already done on the canvas tells him how to proceed. In other words, there is a dynamic relationship between the artist and his subject. This is also true in motion picture shooting. No matter how complete the script is, it is up to the director or cameraman to position the camera or lights; or to direct the action and decide when he has a satisfactory take. Let us come back to the problem of the cameraman who is trying to shoot both stills and movies. While he is switching from one medium to the other, he is interrupting this creative process. And the result is hack work.

I am convinced that satisfactory and useful coverage can be achieved only when the still man can devote himself completely to his task. He can shoot independently at any time, (of course, without interfering too much with the film shooting). With the presently available fast films, he does not have problem of shooting action with the available movie lights. When sound is used, the clicking of the shutter may interfere with the recording. Then he must use a quiet camera and a long lens so that he will not be too close to the mike. If this is not possible, he must get his shot while the director is rehearsing for the take. Most directors kill most of the lights after they are set up, and rehearse with only a work light. But if the still man requests it, the full lights will be turned on for the rehearsal. Of course, a polite, cooperative attitude is important on any job, but the still man's job on the film is an important one, and he should make it clear that he thinks it is, even if he may sometimes annoy a member of the crew who thinks that the shooting of the film is the only job on the set.—THE END

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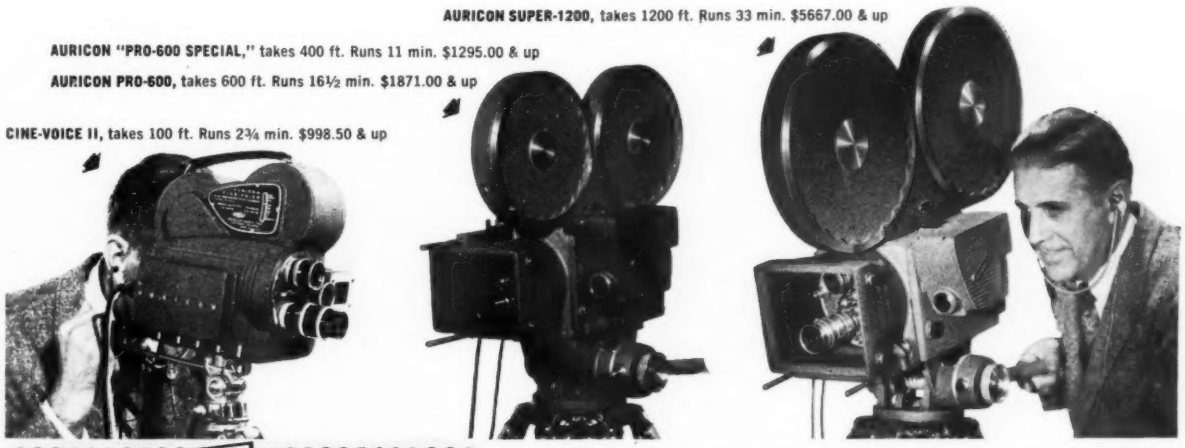

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AN EDITORIAL

WHERE CRAFTSMANSHIP ENDS

If you've done any amount of architectural photography, you've noticed that there is a difference between a house designed by an architect and one designed by a carpenter. Usually the architect's house is more expensive, but the difference does not end there. It is also intrinsically more interesting and more graceful, and this difference cannot be attributed solely to expense. Most important, the architect's is more useful—a better fit for the purposes intended. ■ The distinction extends to photography. Some photographers take the craft attitude toward their work. They view it the way a carpenter views a house, asking, "Are the nails in straight?" They fail to ask, "Is it livable?" An architect asks himself both questions, knowing that the second is the more important. ■ The last thing any of us wants to see go is proud craftsmanship, and it is far better to be an honest craftsman than a charlatan professional, but there is something beyond craftsmanship. The craftsman photographer wants to make sure he can count the hairs in the eyebrow. The professional seeks to make pictures that search beneath the superficial aspects of the scene. He wants to reveal, to communicate forcefully. ■ The craftsman photographer respects his tools and materials, and makes them work for him. The professional respects the principles behind the tools and materials, and makes them work for his client. Optics and chemistry are his friends, not his bugaboos. ■ The professional generalizes his interest in photography to solve the problems of business and industry; the craftsman's interest is limited, often to the gratification of his desire to make pictures. ■ Some photo craftsmen are so wedded to the time-honored methods of making and processing pictures that they reject any means for simplifying the mechanics or broadening the scope of their technique. They blind themselves to the knowledge gained from a hundred years of intensive research and development. ■ The professional relies on his ideas, his knowledge and his judgment. He seeks to exercise them.

The Editors

General Outdoor Advertising wanted a presentation film which would be statistical and informative, yet not put the audience to sleep. To make things interesting, the film had to be made to fit a budget, a semi-economy kind. Using a moving camera and mostly still pictures, Chartmakers came up with an exciting, effective and reasonably-priced answer called "*Outdoor Adventure*"

The screen is blank. Suddenly, a colorful procession of abstract shapes appears, active, moving in time with the modern jazz themes which begin to develop. The shapes are patterned after common map symbols. In the group are two white circles which quickly turn into eyes, eyes which move about to follow the happenings on the screen. As suddenly as the shapes appeared, they disappear.

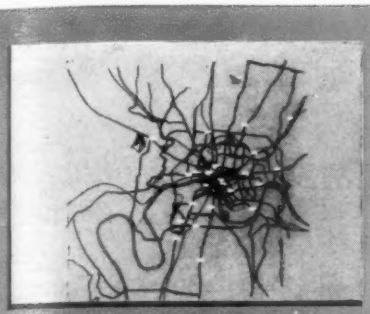
Only the eyes are left, staring and blinking. Save for these eyes, the screen is blank. The music stops in the middle of a measure. Save for the audience, there is no sound.

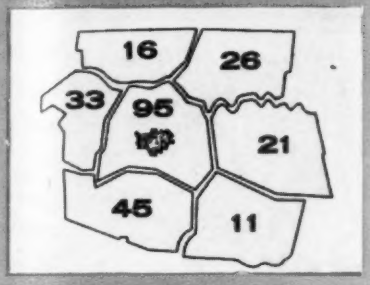
Finally a sound is heard, an eccentric, caricatured sound. From the left comes the body of an automobile, coming to rest over the eyes, as if they were wheels. And, as if the eyes were wheels, the car takes off, leaving the screen once more a blank.

This is not a surrealist film in New York's Museum of Modern Art. This is an advertising film, made to sell a product. The product is outdoor advertising. The film, *Outdoor Adventure*, made by Chartmakers for General Outdoor Advertising Co.

The reason for this approach lies in the nature of the message and in the atmosphere that General Outdoor wanted to create. The message was a report on a survey which provided an objective method for determining the effectiveness of outdoor advertising comparable with methods used in competing media. A mere recital of methods and numbers was not enough. What was needed was a presentation with enough power and impact to sell an advertising man's toughest audience, his fellow ad men. In addition, the objective was to dispel the idea that outdoor advertising was old fashioned. This opening scene set the tone of the film —unusual, modern, concerned with the visual impact of outdoor advertising on the motoring public. The presentation wanted to prove that in today's mobile motoring America, this was a modern way of presenting advertising.

The presentation was to be a soft sell to avoid the blaring repetition which dulls the senses of television viewers. Instead of repetition the opposite technique was used. No fact or idea was repeated. It was presented only once, either by the narration or the screen action. If the viewer missed the point,





STATISTICS WITHOUT TEARS. Overlay (above) indicates degree of automobile travel in each section of a hypothetical city, based on the results obtained from two-year survey of auto traffic patterns. Typical billboard ads (below) were used as "stoppers" to jolt viewing audience.

he just didn't get that part of the message. The result was to induce concentration. At the same time, the picture was made attractive so that the concentration was relatively painless.

Since the basic theme was that the mobility of modern American living makes outdoor advertising a *modern* medium, art and music were executed in a modern style. The art is exciting and dynamic. The music, composed by Mundell Lowe, is in the jazz idiom made popular by television's *Peter Gunn:* modern, but not "way out." The major emphasis was on being exciting, different, interesting, attractive and, it was hoped, effective.

Ingenious devices were used to achieve the desired effects. For example, the use of odd shapes which did not fill the entire screen area. The eyes in the opening sequence are a sample of this. The reason for the technique was not only to emphasize modernity, but to avoid any identification, however subtle, with the rigid rectangle of the movie or television screen. The screen action keeps popping from one part of the screen to the other. Where there is no action, the screen is dark.

Narration was kept to a minimum, used only when there was data which the screen could not present in an effective manner. This was such information as the name of the agency making the study or the number of automobiles passing a given point. Of the 14-min. running time, only about 4 min. is devoted to the narration. For the most part, the music carries the message.

Typical of the treatment given to statistical data to make it more palatable is the animation of a graph (*background to title*) showing the correlation between degree of display and degree of exposure to possible customers. Wipe-on animation was used: first the vertical line were revealed, then the horizontal lines and finally, as the narrator gave the figures, the two curved lines representing the data. Only for a few frames at the end of the presentation was the chart static. In terms of the film as a whole, the chart was a very minor detail, yet it carried its point effectively.

Another graphically simplified statistical presentation uses an animated city plan to show what percentage of automobile traffic orig-

STILL PHOTOGRAPHS were used as well as original art work. This sequence is from the conclusion of film where argument in favor of outdoor advertising is summed up. Main point is that instant recognition and long-term retention results from outdoor ads.

inates in the various sectors of the city. The figures reveal that virtually all (95 per cent) of daily automobile flow passes though the center of the city. An overlay is used to show the traffic flow and then the placement of advertising billboards at strategic points where there is a heavy traffic flow.

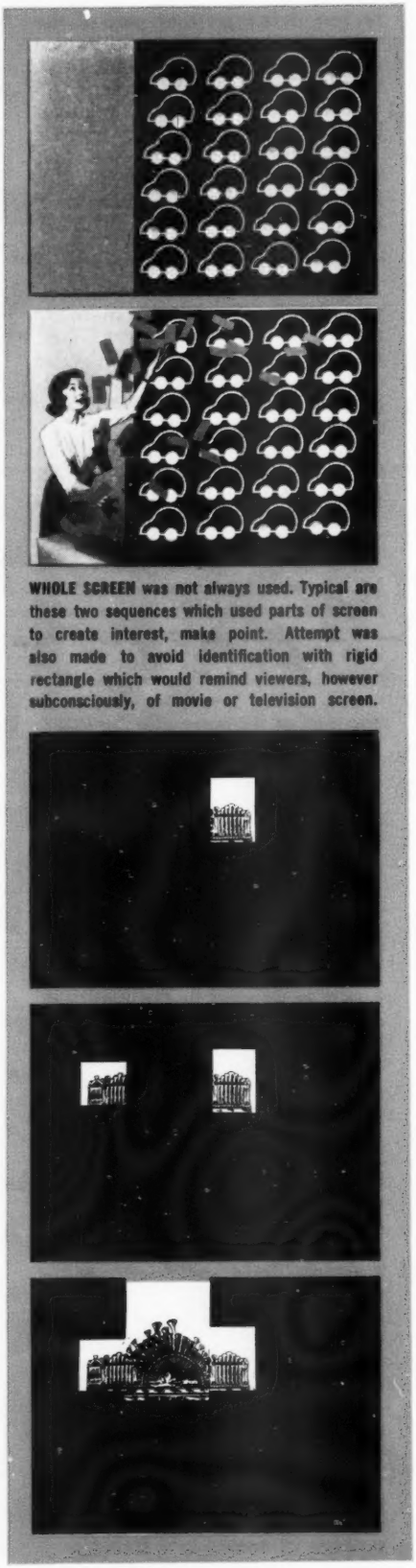
The film has been quite successful and is credited with helping General Outdoor rack up record sales for 1960. Despite its attractiveness as a presentation and its effectiveness as a sales aid, *Outdoor Adventure* was made on a fairly low budget.

This, in fact, was the basic problem posed by General Outdoor when the film was planned. How could they get maximum impact without sacrificing solvency? The answer lay in using what photographer Mort Corwin called "a modified filmograph technique" *(see "Navy's Moving Stills," PMI, September 1960)*. He calls the technique modified because it uses not only camera movements but some animation and cel movements. This modification does not affect costs materially, however. It was estimated that this film cost about 1/10 the cost of a fully-animated film and slightly more than a slidefilm.

The photographic aspects were, according to Corwin, largely routine. Some modifications had to be made in desired movements to allow the film to fit within the budget but in general, there were no unusual problems. An example of saving money on movement was the use of popping—a subject would appear on one part of the screen, disappear momentarily, then pop out at another part of the screen. This is faster (hence cheaper) than moving the subject and photographing this movement. In general, films of this type represent what Corwin calls a compromise between cost and time.

A major problem of the animation cameraman is to avoid "hickys," defects which occur in the middle of a roll. Animation films are edited before shooting and shot in sequence so that a final film comes from the lab. Any defect means that the film must be done over again. Apart from the normal care required, *Outdoor Adventure* was primarily a problem in planning and art, rather than a problem in camera work.

As with most modern problems, in the beginning was the survey.



WHOLE SCREEN was not always used. Typical are these two sequences which used parts of screen to create interest, make point. Attempt was also made to avoid identification with rigid rectangle which would remind viewers, however subconsciously, of movie or television screen.

It supplied General Outdoor Advertising with a formula designed to measure the effectiveness of outdoor advertising in terms comparable to that used by competing media. The question was to translate the survey into selling terms to influence advertising men, experts at getting the most audience for their client's dollars.

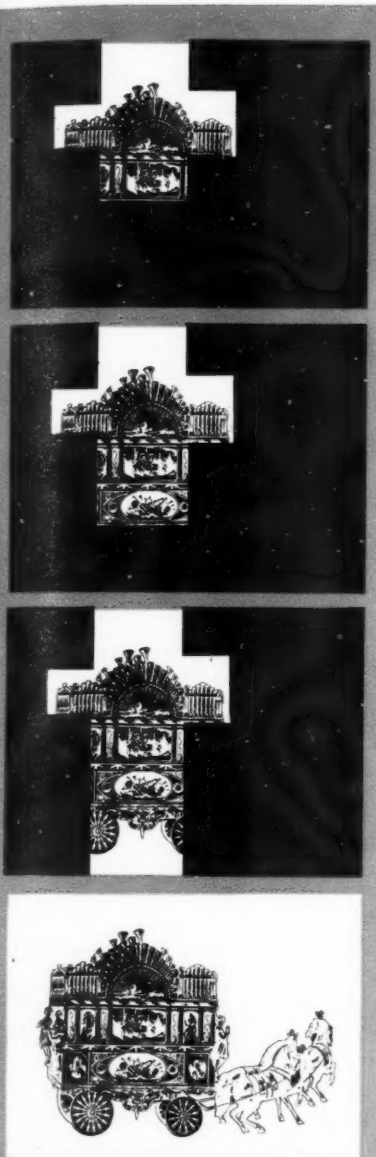
Chartmaker's a New York firm with a long specialization in bringing statistics to life through displays, slidefilms, etc., came into the picture with a four-page written proposal. It discussed the aims of the film, the area to be covered, the audience to be reached and the possible methods for attaining the objectives. This proposal was accepted and the contract signed.

The next step was preparation of the complete storyboard involving about 125 different drawings. This was prepared with the final copy and shown to the client. Final approval was given and the material went to photographer Mort Corwin for filming.

The first job faced by Corwin and film editor Robert Braverman was to analyze the sound track which had been recorded separately on 16mm magnetic tape. This established the relationship between the musical themes and the visual scene. For example, if a car is to move in time with a musical beat, it must be photographed so that the screen time is long enough to permit synchronization between the two. Certain themes were used to fit certain scenes and the film and music had to coincide. The ability to analyze a track is a matter of skill and experience. Establishment of the time/frame relationship took about a week.

The next step was preparation of the exposure sheet which would tell the cameraman how long to expose and the size and length of the movements—pans, zooms, etc. The actual shooting was done on an Oxberry animation stand using 16mm Commercial Ektachrome exposed and processed according to manufacturer's instructions.

The shooting took about a week. Corwin, a former still photographer who specializes in presentation films, has designed several modifications of existing animation equipment which permits him to complete shooting in about 25 per cent less time than normal. Since labor time is a major part of the cost of animation, any reduction can re-



SMALL BEGINNING marked many sequences. In this circus wagon series, the main object could be identified by an outstanding characteristic, such as the garish decor of the calliope, even before the whole object was visible. Point was that continuous exposure to outdoor advertising leads to faster recognition and that people can recognize objects in a remarkably short exposure time. Thus, a long term outdoor advertising campaign could pay off in increased sales.

sult in lower costs and a competitive advantage.

Perhaps the best idea of how the approach used at Chartmakers fitted into the general theme of the film can be had by comparing the script directions with the circus sequence shown at the left.

The circus theme is introduced by music played by one of those inimitably brassy circus bands. The screen is black except for a small area with some pipes visible. There is no way to know just what will be revealed. Frames later, a second small area becomes visible on the black screen with more pipes. A third area, this time the space between the first two clear areas, is revealed and the general shape of a calliope is evident. The point being made here is that recognition does not necessarily depend upon seeing the whole of a complex object. Rather, certain characteristic features will inform the viewer of the object. From this flash of recognition, his mind supplies the added data so that the sighted object has meaning. Eventually, the whole screen is shown with the horse-drawn calliope. However, long before this point is reached, the viewing audience has grasped the meaning and significance of the calliope.

The small areas reflect the desire to avoid any identification with movies or television.

Much the same point was made by the countdown series of numbers, similar to a movie lead-in. The sexy picture replaces one of the numbers, being held for about the same length of time, perhaps 1/50 sec. as the numbers themselves. This provides not only a sudden change of pace but also visual proof of the speed of recognition.

This then, is the story of *Outdoor Adventure,* a story that can be summed up in one word, *talent.* This is how this talent was used to produce an effective visual presentation to fit a modest budget.

It was not an individual affair. If either the writer, art director or photographer had been lacking, the result would not be half as good. As it is, this film not only serves the sponsor's purpose but is a worthy piece of film making on its own.

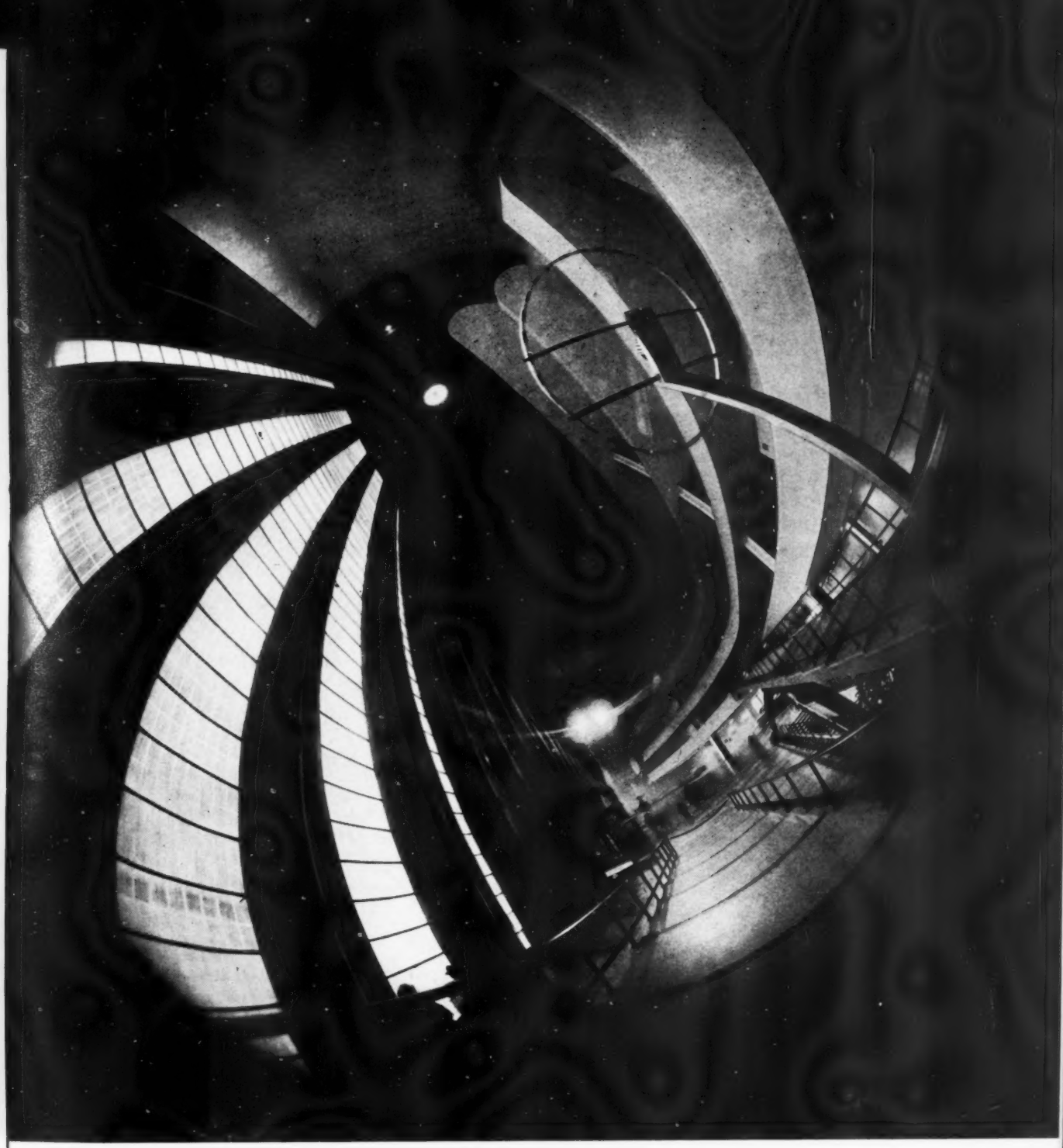
Although this film did not involve photographic technique as such, it does represent a case history in visual communication, which is, in a sense, the basic business of every photo section.

SPEED OF RECOGNITION. A series of numbers were flashed on the screen. Between seven and five, instead of six, was a picture of a sexy-type female. Recognition was instantaneous, proving that outdoor ads had time to register.

PORTFOLIO NO.31

In 1826, when Nicéphore Niépce permanently recorded the simple courtyard scene below, he nurtured an infant technique that was to grow into a science almost as limitless as man's exploring mind. Here, 135 years later, are some of the achievements of Niépce's child....

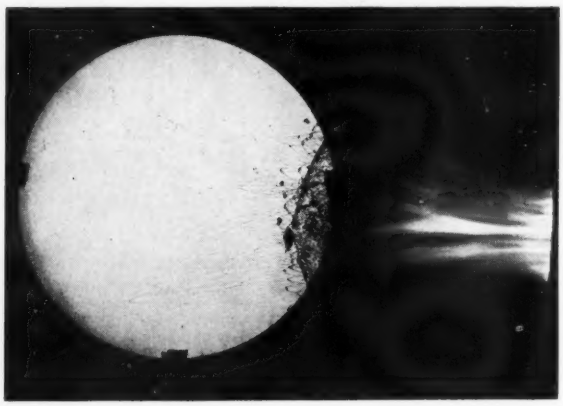
World's First Photograph, from the Gernsheim Collection, London



WIDE-EYED WONDER Psychologically, some of the most startling wonders of photography are the effects achieved by special wide-angle equipment when trained on familiar subject matter. The effects seem to defy our senses. The picture *(above)* of the lobby of the United Nations Building is a case in point. Made by New Jersey optometrist Eugene Trachtman, this photograph covers a complete 360-degree view on the outer rim with a 240-degree view from rim to rim. His patented camera employs a 120-degree lens in a circuit mechanism. Another weird effect of the circuit camera is the picture on the following page. A Zoomar 360 camera covered the Chicago skyline from a tilted axis, producing the sine wave horizon. The widest of the wide-angle lenses being marketed commercially is the 16mm f/8 180-degree lens of the Nikon Fisheye Camera.

SHORT EXPOSURE

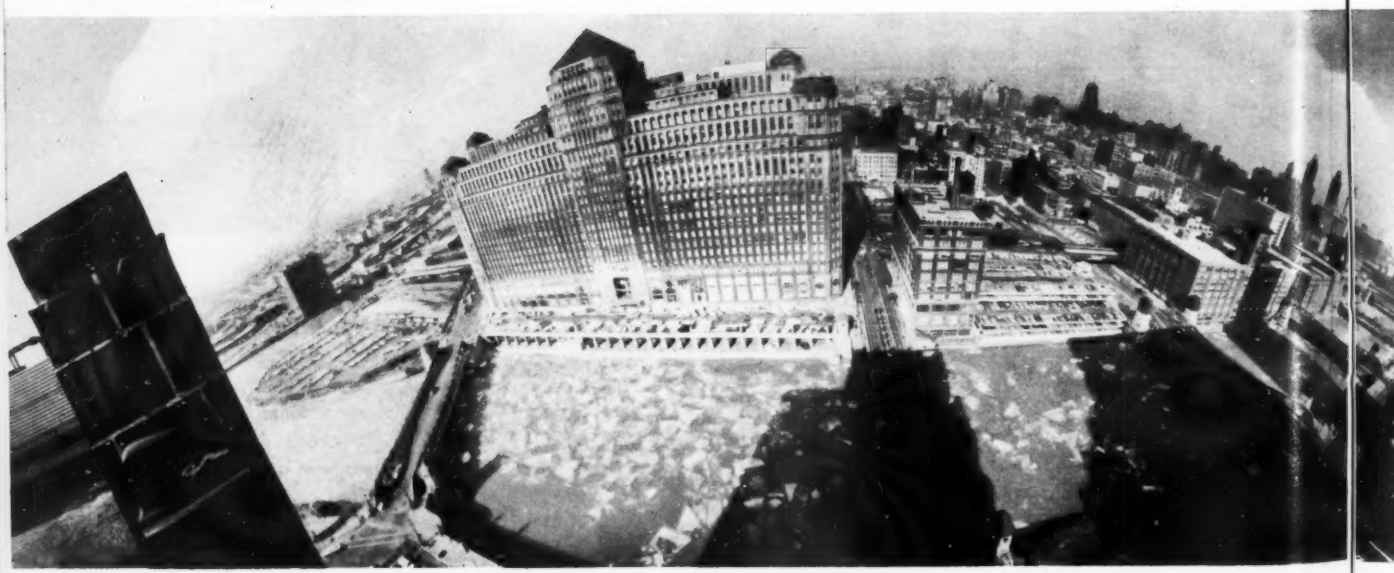
Particles from a small dynamite cap explosion, photographed as they passed across the face of a lens illuminated for 1/100 microsecond by a small spark gap. Although pictures of shorter duration are possible with the Kerr Cell or a spark gap, Dr. Harold E. Edgerton of MIT believes that 1/100 microsecond is the "shortest practical exposure." The exploding particles can attain a velocity of 1000 to 3000 meters per second, and the fastest of these are seen spearheading the shockwave. The white flare at the right of the photograph is caused by the light from the explosion of the cap. One of the difficulties in taking such photographs is the protection of the camera and field lens from flying particles. One method is to protect lenses with safety glass. Still faster photographs can be made by borrowing on electronic techniques in the image converter systems.



SHARP STOP SHADOW

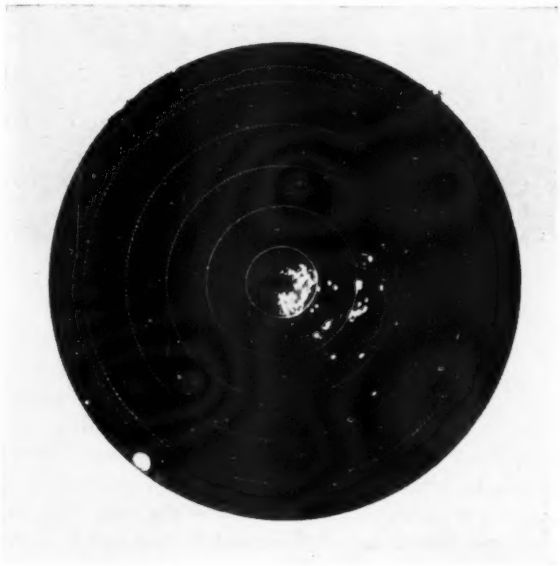
Designed to bring subjects buzzing along at velocities of 3400mph to a screeching halt, an x-ray machine made by Field Emission Corp. probably holds the radiography speed record. It captures the inner workings of explosions and similar speedy subjects at exposure times measured in the hundred millionths of a second. It may lag behind the very fastest photography but it promises to uncover some vital facts for America's defense researchers. Since a radiograph is essentially a shadow pattern of penetrating rays cast by the subject on a film, the smaller the light source, the sharper the picture. The Fexitron's x-ray gun packs a punch of about 1000 amperes per square centimeter. The picture gives a clue to the sharpness and potential use of Fexitron's images. This picture was exposed at two ten-millonths (.0000002) of a second with the .45 automatic, at 12 ft. from the x-ray.

Chicago through a Zoomar 360



FAST DEVELOPMENT

What appears to be a target punctured by shells from the nearby revolver is actually a sharp reproduction of the face of a radarscope, apparently grainless in this 5½X blow-up from a 35mm original. It is the result of a rapid processing system developed by the U.S. Army Signal Research and Development Laboratory which can develop, fix and project a negative in .2 sec. *(see **Accelerated Processing,** PMI, **February 1959**).* The system was developed for screening pictures of a radarscope for persons responsible for air traffic control.

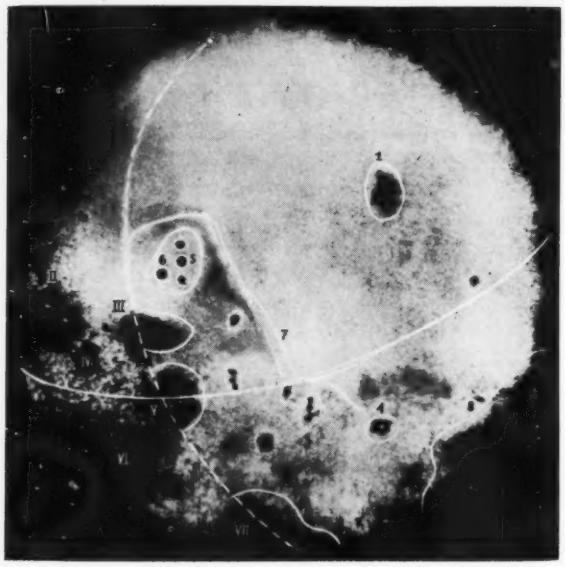


UNDER THE POLE

One of the first photographs ever taken of the underside of the North Pole shows U.S. Navy frogman Earl J. Crowley, of the nuclear-powered submarine ***U.S.S. Seadragon,*** holding one of the Sampson-Hall underwater motion picture camera outfits used to record the historic transit made in August 1960. The fourth nuclear submarine to traverse the Pole, the ***Seadragon*** became the first ship to make the transit from the Atlantic to the Pacific, completely navigating the classic Northwest Passage through the Canadian Arctic. As the ship paused in its passage directly under the polar ice, hardy Navy frogmen slipped into the 28° F water to capture the great moment on film. The cameras they used were a modified 16mm Bell & Howell Filmo 70-DR and a 35mm Bell & Howell Eyemo. (Official U.S. Navy photo.)

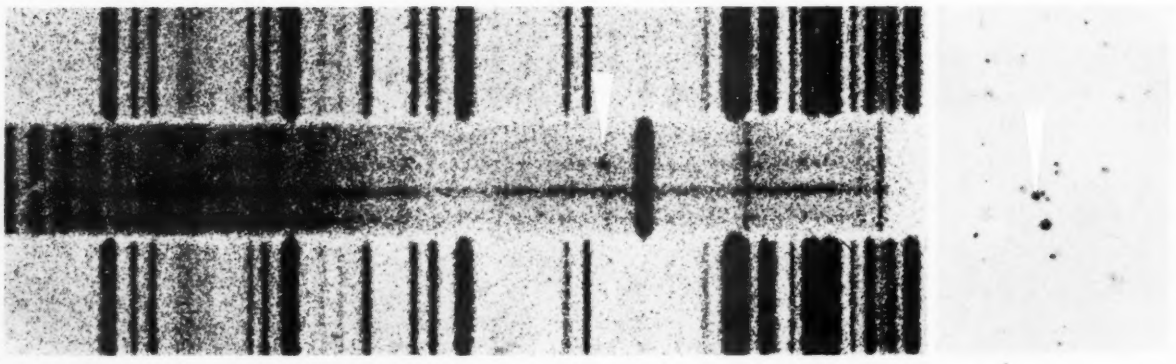
IN BACK OF THE MOON

One of the first pictures of the far side of the moon taken in 1959 from Russia's Lunik 3. The Russians have not described the camera that took the pictures, but it is known that lenses with focal lengths of 8 and 20 in. were used to form, simultaneously, half-frame images side by side on a single frame 35mm material. Standard black-and-white film was probably used. The continuous line drawn across the moon's surface represents the equator, while the dotted line marks the borders between the hemispheres visible ***(left)*** and invisible to the earth.



SMALL WORLD

One of a series of photographs of the earth taken from the greatest distance—200 to 700 miles up—this picture shows about 1/6 of the earth's surface. It was taken during the flight of an Air Force Atlas ICBM on Aug. 24, 1959. The main stage of the Atlas can be seen falling away, after separation from the nose cone. This shot was taken by a 16mm camera installed in the nose cone to help prove the operation of the stabilization system used to orient the reentry vehicle during its flight.

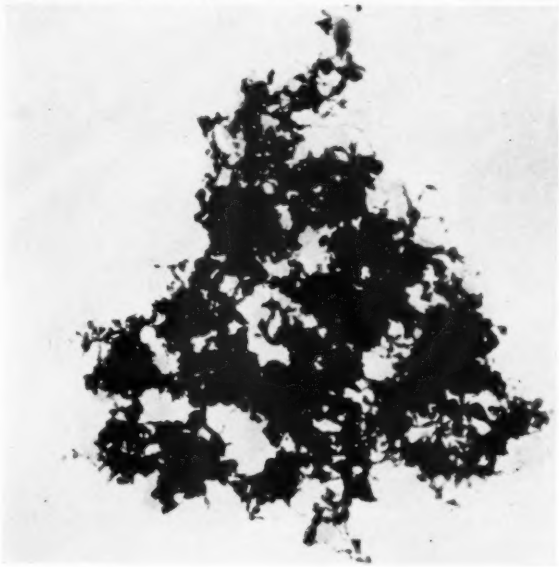


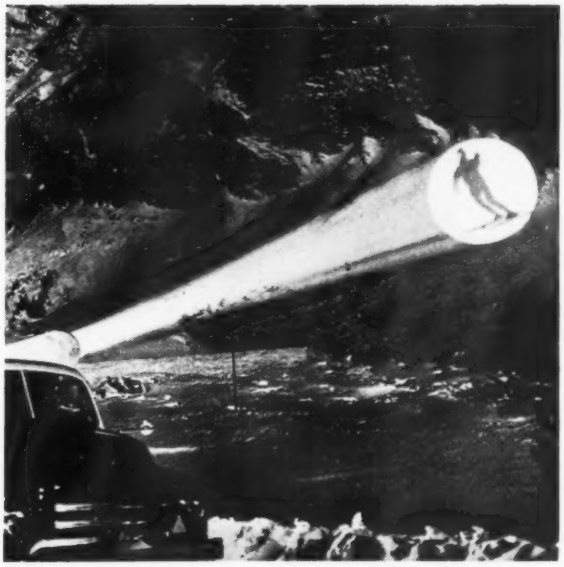
2 BILLION LIGHT YEARS AWAY

Astronomy has long outdistanced the range of human eyesight in its searches of the universe. Most discoveries are made these days through the study of photographic plates and radar telescope data. The most distant known object was identified from the photographic plate reproduced ***(at right)***. The plate was exposed in June 1960 with Mount Palomar's 200-in. Hale Telescope. The marker indicates what is believed to be two galaxies in collision more than two-billion light years away. The distance estimate was made on the basis of the spectrograph plate reproduced above. The marker indicates an oxygen line radically shifted out of its usual place toward the red end of the spectrum, compared to the reference spectra above and below. (Photographs from Mount Wilson and Palomar Observatories.)

BIG, BIG BLOW-UP

Although it is by no means the largest magnification ever made, the photograph of a developed silver bromide crystal is a fitting example of the power of magnification inherent in the electron microscope. The image is 20,000 times as large as the grains which form the picture. Total profitable magnification with electron microscopy is about 200,000 times original size—but the last ten times enlargement is made in a photographic enlarger. Were a photo of a six-ft. man enlarged 200,000 times, the print would be over 240 miles long.

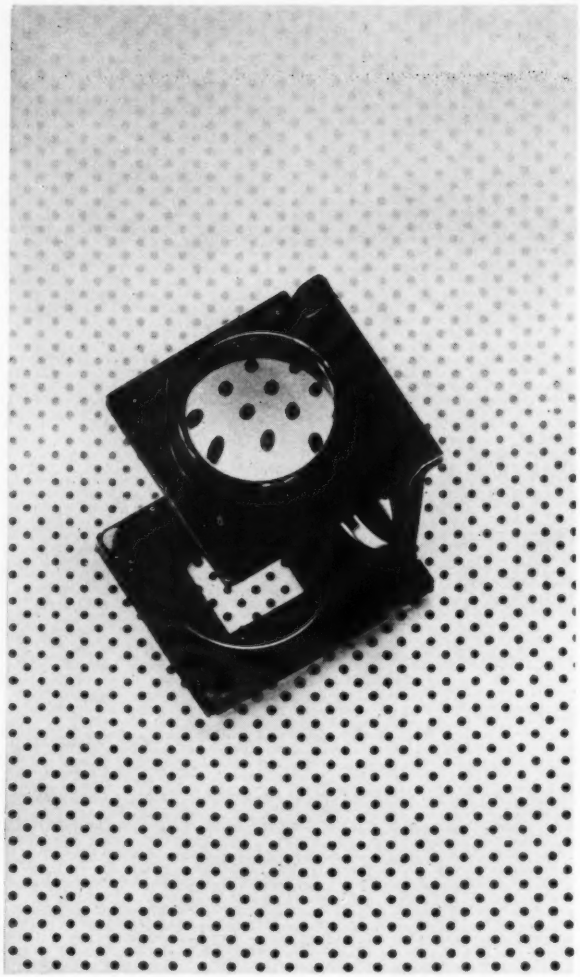


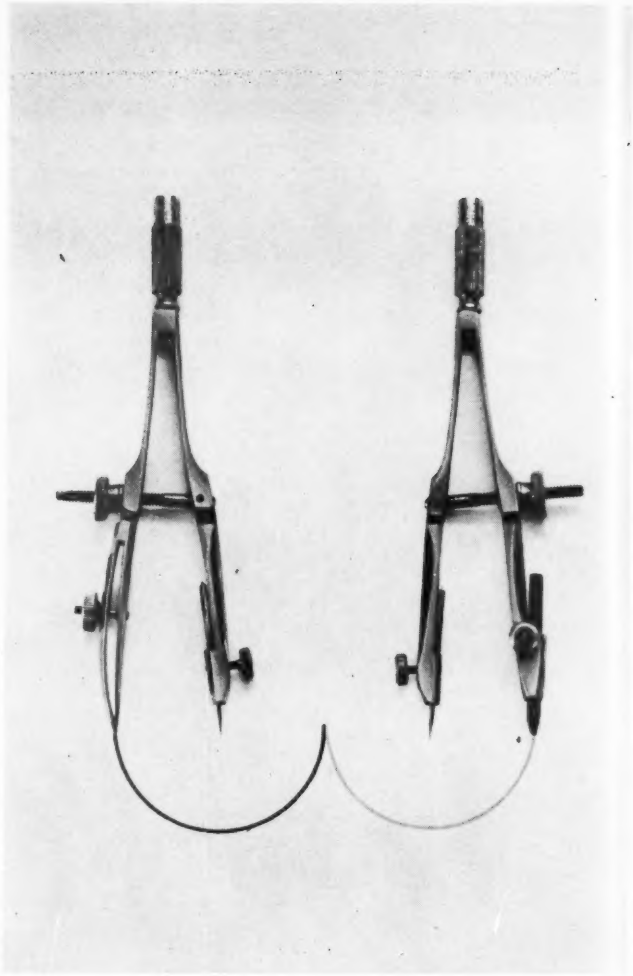


LARGEST PROJECTION

A discernable image, about as large in circumference as the length of ten football fields, can be projected by a new device called the "Skyjector," baby of Swiss inventor Fernand Auberson. It projects specially-prepared 6-in. glass slides, held in an automatic slide-changer, onto such surfaces as clouds and snow-covered mountains. Four automatically adjustable lenses control the angle of projection. A group of lamps deliver 750,000 lumens of light. Cost is over 1½ million dollars.

LARGEST COLOR ENLARGEMENTS ever made as well as photographs taken from the highest point on earth are represented by the panel of pictures above. Taken by Sir Edmund Hillary's expedition during its ascent of Mt. Everest in 1953, they were enlarged for the Kodak Colorama exhibited in New York's Grand Central Terminal later that year. Using a highlight masking technique, internegatives were made from the original 35mm Kodachrome transparencies to accomplish the enlargement. The center photo, of the Sherpa guide Tensing Norkay at the 29,002-ft. summit, was enlarged 177 times from the original slide area. Side panels, with views of Everest, and Hillary and his group, were blown up 190 times from about 2/3 of the original slide areas. The Colorama measured 60 x 18 ft. Photos made with Kodak Retina Cameras, with U-V absorbing filters. (Courtesy Mt. Everest Foundation.)





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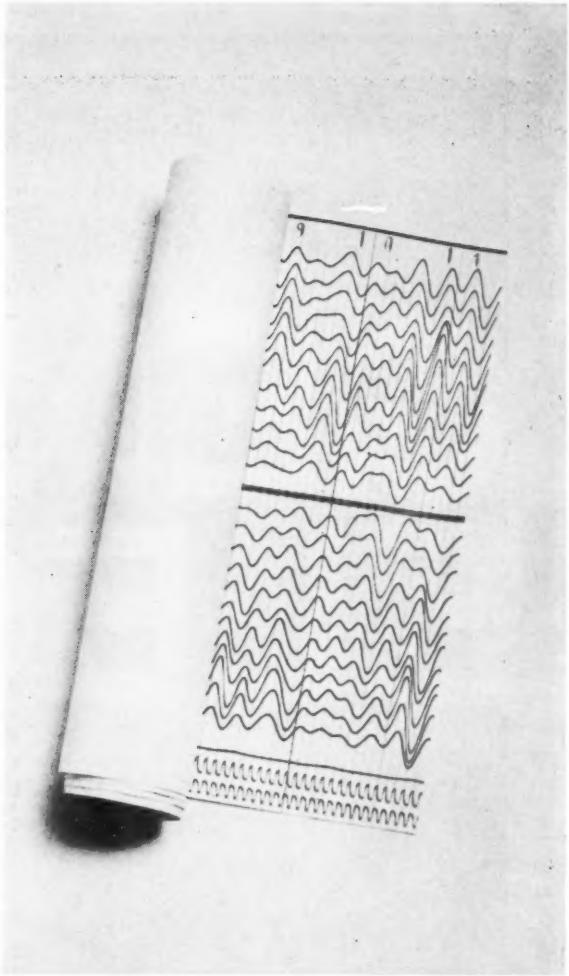

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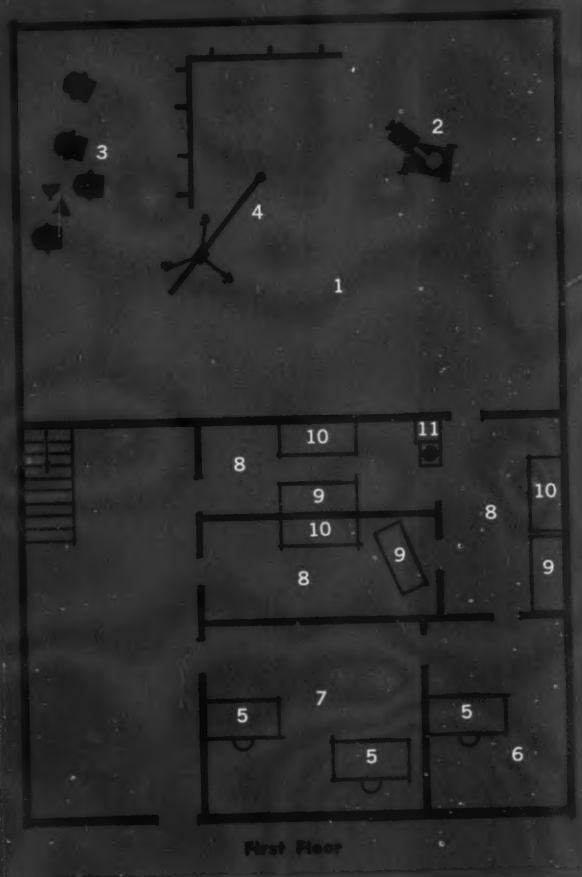
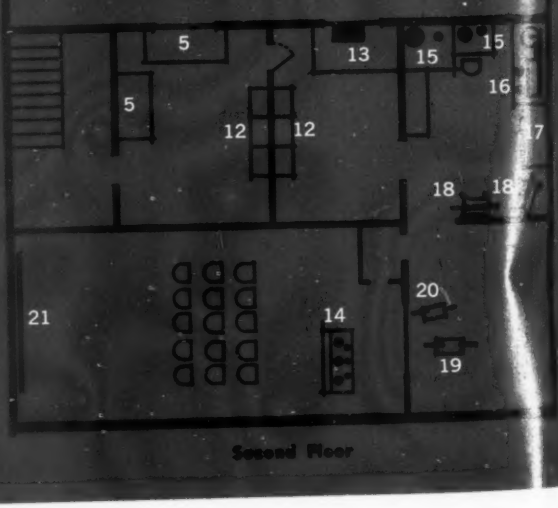
This photo section practically grew up with the motion picture but it has not let history go to its head. Its production today is as fresh and as modern as the jet engines and atomic power installations that it films

GENERAL ELECTRIC COMPANY



1 Studio 2 16mm Mitchell on dolly 3 Studio lights 4 Microphone on boom 5 Desk 6 Manager's office 7 Office 8 Editing room 9 Moviola 10 Editing table 11 Record library and turntable 12 Sound mixer 13 Sound console 14 Screening room sound console 15 Ampex tape recorders 16 Scully Disc lathe 17 RCA Magnetic film recorder 18 RCA Film phonograph 19 16mm proj. 20 35mm proj. 21 Screen



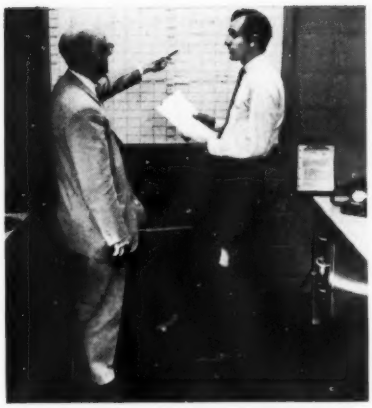
Movies were barely out of the nickelodeon stage when an epic describing *Every Husband's Opportunity* opened in Chicago 1909. Despite the jazzy title, this was a perfectly respectable film, mixing, in the best American tradition, business with pleasure. Its purpose was to show some of the new-fangled, labor-saving devices being developed by the General Electric Co.

Produced by Essanay Films, this was the first of a series of GE films which is being produced today and one of the first applications of the new medium of movies to industry. In 1960, there were 50 GE films, of which only two were produced by outside contractors under supervision of the Film Production Unit, Audio-Visual Operation at GE's Schenectady plant. The two outside films were made by other producers only because GE's own extensive production facilities were being fully utilized.

General Electric films have recorded the progress made by industry, from the early electric locomotives and vacuum cleaners to jet aircraft and air conditioners. Films released under the GE banner carry budgets from $1,000 to $100,000 per film. Basic responsibility for these releases is borne by the Audio-Visual operation.

Headed by Ray Bonta, it is part of Advertising and Sales Promotion and consists of three operating units. The first is Programs, responsible for writing and producing the films. The second, Staging, handles the planning and preparation of all A-V presentations. The third, Film Production, does the actual filming and editing. In terms of a triple-play, the score card would read: Programs to Film Production to Staging.

Photographer Rehbaum loads Mitchell



Manager Abeel (1) and Fragomeni

Requests for film service come through the A-V Communications Operation office. Film Production comes into the picture for consultation during the planning and writing stages. This is a nine-man operation at present, headed by Ken Abeel, Manager. He started with GE in 1928 as a business trainee. In 1933 he entered Film Production and in 1942 was asked to administer the movie unit. This unit is one of the oldest in-plant film sections in the United States.

Film production at GE began in 1912 with a movie on railway electrification. In 1915, another railway electrification film, *King of the Rails*, opened at a Broadway movie theatre and scored a commercial success. (During the movie's early period, it was not unusual for theaters to exhibit commercial films, made by such firms as GE or Ford, along with the commercial product.) The result of this success was the establishment, in 1916, of the Visual Education Operation.

Headquarters of GE film activity today is in a former television studio that has been adapted for motion picture use. The modifications involved changing the soundproofing, converting some of the control rooms to editing rooms and installing new sound channels suitable for motion picture recording systems. There, cameramen, editors and sound men, turn out films on a variety of subjects, from corporate reports to the latest in electrically-equipped homes, from a progress report to a film on atomic reactor installation.

Ronald Fragomeni, formerly carried as a film editor is now production coordinator. He handles cost estimates, budgets, cost control and production schedules.

Three cameramen are assigned to the unit. Dean of the crew is Laurence Kroger who has had 42 years behind a camera. Robert Rehbaum and John Goerg, both former Marine Corps cameramen, complete the trio. Milton Robinson supervises the sound department assisted by Charles King while Charles Kupinski is Chief Film Editor. The inevitable and invaluable "girl Friday" is Mrs. Audrey Lattanzio.

The equipment used at GE includes 16mm Mitchells, Arriflex, Cine Special, two Filmos and an Eyemo, plus a 35mm Arriflex. A 35mm Mitchell is used mostly for slide film production since the unit standardized on 16mm.

Films used include Tri-X and Plus-X, with Ektachrome Commercial as the standard color emulsion. Tri-X is shot at an index of 400 or 500, if necessary, and Plus-X at 160. Experiments are just being completed with the recently-introduced Double-XX. Although Eastman recommends an index of 200, the unit's tests give good results at indices up to 400 and it is quite possible that this may become the standard film, reserving Tri-X for low light shooting.

Because of experience gained when GE processed its own films,

Photographer Goerg at animation stand

the unit is able to keep fairly accurate check on the processing, using sensitometric and densitometric analysis. Generally, negative emulsion is developed to gamma of .65 and the positive made to a gamma of 2.5, giving the desired product gamma (negative times positive gammas) of 1.5.

At present, GE films are processed in New York. The day's shooting is sent in the company mail truck and

GENERAL ELECTRIC (*continued*)

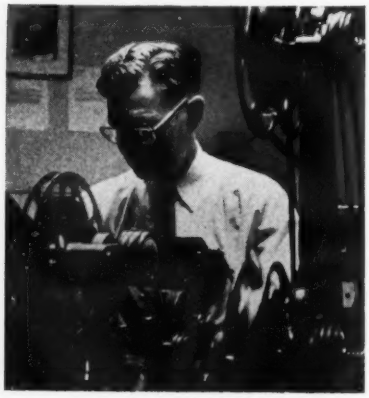
processed and returned within 24 hours for black-and-white stock. Color processing and edge numbering takes a week.

About 75 per cent of the current shooting is studio work and the rest location. In both cases, according to Abeel, the basic problem is in the subject matter, not in the photographic mechanics as such. Studio lighting, supplied by a battery of lighting units in sizes to 5000 watts, is at a level of about 400 foot-candles in color and about 200 foot-candles for black-and-white (Plus-X). This provides enough light for exposures varying between f/2.8 and f/4 for color, f/4 and f/8 for black-and-white.

Location shooting presents some lighting problems. Power for the lights can be obtained either from the line or from the unit's generator truck. Power from the truck is preferred when shooting color, since the line voltage can be more completely controlled for proper color temperature. A shift of one volt in the line means a shift of ten degrees in color temperature.

Available light is not used unless the script or the budget call for it. The reason is that standard plant lighting is rather flat, too uniform.

Sound can be a problem when photographing on location, especially if synchronous sound is desired and the ambient noise level is rather high. If lip sync is a must in areas where there is a high noise level, particularly background noise which is natural to the scene, the GE unit will use a cutaway synchronous insert. If the action takes place in a factory, for example, a small set matching part of the factory is built. Lip sync is then recorded in a scene photographed against the set. Natural background noise is dubbed in behind the voices during rerecording. Thus, the speech is intelligible over the noise.



Editor Kupinski at work

Soundman King at Ampex tape recorder

Sound equipment available in the Film Production unit includes an RCA 35mm magnetic and photo film recorder, two Ampex tape recorders, two 16mm Magnasync magnetic recorders, a Scully Disc lathe, four RCA film phonographs and associated projector equipment. In addition, there are two complete recording channels. The whole installation is controlled by a Selsyn interlock system.

All sound work is taken care of within the unit as well. Sound is recorded using a 16mm Magnasync (there is a 35mm Magnasync for occasional use). This is transferred to 3M 35mm magnetic film which is used for editing and re-recording. For release purposes, this is transferred to a 16mm optical track by the lab which processes the film. If necessary, the sound can be transferred to 35mm optical track but virtually all GE releases now are on 16mm.

Field recording is done usually on 16mm magnetic recorder and transferred to 35mm magnetic film using an RCA recorder for editing and recording. For work on studio sound stages, sound is recorded directly on 35mm.

The range of lighting equipment available to GE cameramen includes six 5000-watt Bardwell & McAllister units, three sky pan, five 2000-watt units, plus assorted smaller sizes. Some of these are studio based while others are used with the section's 400-amp. generator truck to provide lighting for location work.

Included in the pioneering done by GE's Audio-Visual Communications Operation were the first sound-on-film industrial films. In 1919, Charles Hoxie of the GE Engineering Laboratory developed the Pallophotophone variable area process and was granted a patent in 1921. In 1926, General Electric produced several experimental sound-on-film pictures. (The pioneering nature of this work is more fully appreciated when one realizes that the 1928 sound film *The Jazz Singer*, which revolutionized the film industry, was not sound-on-film, but disc recordings, the Vitaphone system). The variable area system which is an optical sound system is used today.

In addition to movie cameras, the Film Production unit uses 4 x 5 Speed Graphics and Polaroid cameras to make record shots of sets and locations, stills, pictures of the section at work, etc. However, there is a separate still photography unit located at Schenectady.

A fair amount of controversy can be stirred up by asking which is better, in-plant production or outside contractors. Actually, both have their uses but the in-plant section offers certain advantages. These include, according to Abeel, the ability to handle immediate assignments and sudden events which need coverage and the knowledge of film production needed to serve adequately as staff advisers to management. At GE, for example, Film Production acts as the liaison and supervisor of outside film production, a function which they can fulfill more effectively, thanks to their knowledge of film production. Another factor is that quite often, production schedules are not fixed

Soundman Robinson and Scully Disc lathe

Studio shooting in a remodeled television studio, Schenectady

and filming of a particular process or product must often be delayed. With an outside film unit, this could be extremely expensive. The in-plant unit can often handle other chores during standby time.

However, GE operating units are not required to use an in-plant section if they can get comparable service from outside producers for less.

While no hard and fast rules can be laid down, GE's Film Production unit is basically a home-grown unit. Although two of the cameramen had Marine Corps experience before coming to GE, neither the sound men nor the editor had previous movie experience when they joined GE. Long service is the rule and the company policy includes retirement at 65.

Although many in-plant sections use outside editors, Abeel feels that an in-plant editor has several advantages. For one thing, he is available and present during the various recording and re-recording sessions so that he is thoroughly familiar with the production. Then too, he does not have to do a rush job of editing. With an outside man, the natural tendency would be to have him edit the film as quickly as possible as any delay would cost too much. An in-plant editor, can work on several films at once and can plan his work more efficiently.

There are three editing rooms at the unit's headquarters. Each of them is equipped with a Bell & Howell foot-operated auto splicer for making hot splices, a CECO 35mm magnetic tape splicer and editing tables. Table equipment includes a Moviescope 16mm viewer with a Moviola synchronizer unit and a magnetic head for sound pick-up.

GE uses an arrangement which may be unique in the industrial field, combining a 16mm picture head with a 35mm sound head. This is due to two factors. One was that the section had 35mm equipment available from the days when it handled mostly 35mm film. The other is the feeling that 35mm with its 90 ft/min travel as compared with 16 mm's 36 ft/min provides better sound quality. Also, it is possible to edit 35mm to within a sprocket, eliminating syllables, if necessary, whereas 16mm can only be cut to within a frame.

The greater flexibility of 35mm does not take any more time or effort. When the changeover to 16mm took place during the forties, it was found to be as practical to adapt 35mm equipment already in the section as to get new 16mm equipment.

There are two pre-view Moviolas with three separate sound heads, for voice, music and sound effects. Abeel estimates the editing time at about 40 hours for every ten minutes of screen time. This figure includes all possible steps including editing of voice, music and sound effects, and, of course, varies with the complexity of the film.

For location shooting, a four or five man crew is sent out. The crew will consist of two cameramen, two soundmen and a grip (the fifth man who is optional). Here too, Abeel considers the major problems to be creative rather than technical. An example cited was a recent film on barn hay curing. Spontaneous combustion can cause fires in poorly ventilated barns. The problem was to find a barn to photograph and to burn. This was easier in theory than it turned out to be in practice. Finally, a front side of a barn was built actual size and a model of the barn 1/20 actual size. By shooting and cutting from one scene to the other using both sets, the desired effect was secured. However, one final step remained. They had to find a full-scale barn which was burning. Through the cooperation of the local Sheriff, they were able to find a just-burned barn which was still smoldering.

Abeel draws an analogy between the Film Production unit and the basic manufacturing process. "The writer might be compared to an engineer and the photographer to the technician. It is the photographer's job to interpret accurately the creative aspects envisioned in the script. As for photography, it is a basic process which should become a means to the end, not the end in itself."

It is a long way from the first silent films to the present sound, color films turned out by GE. Many of these early films are being withdrawn but several are kept in the library, transferred to acetate stock from the original nitrate, and preserved as priceless, historical documents. One early film shows Edison and Steinmetz at work while another shows the Panama Canal as it looked about forty years ago. This is a rich heritage, but it does not prevent GE's Film Production unit from being as progressive in the days of the atom and the jet as it was when it experimented with selling GE and its products using the new medium of the movie.

1924: Edison and Steinmetz

8MM

A REPRESENTATIVE SAMPLE OF CAMERAS CURRENTLY ON THE MARKET, THESE MODELS OFFER SOME OF THE QUALITY AND VERSATILITY NEEDED FOR ANY SERIOUS WORK IN 8MM BY IN-PLANT UNITS. BEST ADVICE IS STILL TRY BEFORE YOU BUY

Although a great deal of thought is being devoted to possible uses of 8mm in industry, virtually all ideas are based on the use of 8mm release prints from 16mm original footage. The idea of using 8mm cameras for taking motion pictures is not, at present, widely accepted by in-plant photo people. Their objections are based upon the relative inferiority of 8mm to 16mm showings, a relationship inherent in the size difference between the two frames. However, there are many cases where the quality of 8mm is perfectly adequate for the immediate requirements or for showings before small (about 20 or 30 people) audiences.

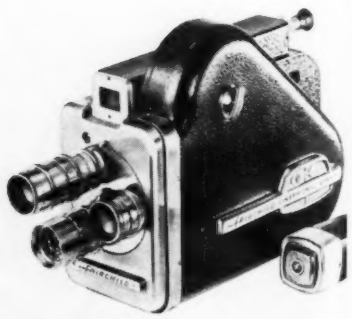
Apart from the qualitative difference, 8mm does offer advantages in economy, widespread availability of equipment and material, ease of handling and carrying, not possessed by the larger, more professional 16mm cameras and projection equipment. Its status might be compared to 35mm 25 years ago.

Typical examples where 8mm might serve would be the filming of sales and engineering reports, where a record was all that was needed. Some multiplant firms send

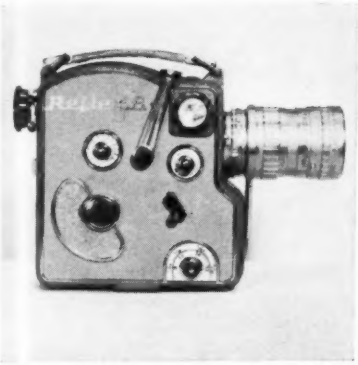
Bolex-H8 is basically a 16mm camera (H-16) redesigned to use 8mm film in special 100-ft. rolls. This gives 200 ft. of finished film for a screen time equal to 400 ft. of 16. Speeds from 12 to 64 fps and single frame. Run is 10½ ft. Can be used with electric motor. Three-lens turret uses standard D-mount lenses. Reverse and forward winding. Automatic film threading. A wide range of accessories is available for this camera. Prices begin at $250 for standard model with 12.5mm f/1.8 lens, $282.50 for deluxe model with reflex focusing. Paillard, Inc., 100 Sixth Ave., N.Y.C.

Bolex B-8VS is one of three cameras in this series. Others include C-8 with single-lens D-mount and D-8 with three-lens turret. B-8 has two-lens turret. Simple models have single 18 fps speed, advanced models, 12 to 64 fps. Wide range of accessories available including zoom lenses. Single frame exposure. Variable shutter permits fade-outs, fade-ins, etc. Accepts standard 25-ft. roll with approximately 7-ft. run on one winding. Prices range from $79.50 for C-8 to over $200 for D-8L with lenses, varying according to lens chosen. Paillard, Inc., 100 Sixth Ave., New York 13, N.Y.

Emel Plume is a French camera which looks like a shrunken version of the Eyemo. It is made in a reflex and zoom-finder model. Speeds are 8 to 64 fps, single frame. Accepts lenses in both D-mounts and S-mounts (same thread as D-mount but has a slightly longer rear distance). Three-lens turret. Frame counter goes forward and backward. No American distribution has been established yet. Price without lens is expected to be about $150. Accessories, at additional cost, include an electric motor and a rifle-type grip. Available lenses include Som Berthiot and Angenieux.



Fairchild Cinephonic is the first 8mm sound-on-film camera. Camera takes either special 50-ft. sound film or standard 25-ft. silent film rolls. Motor and sound recording unit are built-in, battery-operated. Basic lens is 13mm f/1.8 fixed focus lens with accessory 38mm telephoto and 8.5mm wide-angle f/1.8 lenses. Camera has headset for monitoring sound during operation. Camera operates at 24 fps speed only. Accessory exposure meter screws into lens mount on turret. Price, $249. Distributed by Fairchild Camera and Instrument Corp., 580 Midland Ave., Yonkers, N.Y.



Camex Reflex is available with or without behind-the-lens exposure meter. Bayonet lens mount accepts zoom lenses (Pan Cinor or Angenieux) or regular lenses from 6.5 to 145mm. Speeds from 8 to 32 fps, single frame and back winding. Has electronic flash sync for single frame exposures. Click signal after every 20 in. of film is exposed. Wide range of accessories for underwater and other specialized fields. Prices begin at $179 for Standard with 12.5mm f/2.5 lens; add $60 for exposure-meter Dual Reflex model. Details from Karl Heitz, 480 Lexington Ave., New York 17, N.Y.

Konica Zoom II uses a 12-32mm Hexanon f/2 zoom lens. Film speeds of 16 and 24 fps with regular battery, 48 fps with booster unit. Electric motor drive runs up to 40 rolls on one set of batteries. Built-in exposure meter coupled to lens diaphragm operates by lining up two needles. Reflex focusing. Battery tester, visible in viewfinder, indicates sufficient battery power for uninterrupted filming. Accessories include telephoto, wide-angle converters, remote control unit, microscope attachments, etc. Price, $229.95. Konica Camera Co., 76 W. Chelten Ave., Philadelphia 44, Pa.

Canon Reflex Zoom 8 has a built-in f/1.4 10-40mm zoom lens. Speeds from 8 to 64 fps and single-frame. Length of travel about 7½ ft. per winding. This camera uses both ground glass reflex focusing and an optical split-image rangefinder. A built-in exposure meter is coupled to the lens aperture; the diaphragm ring is turned until two needles on the meter are matched up. A warning chime sounds about 3 sec. before the spring runs down. Accessories include close-up lens and pistol grip. Price, $239.95. Distributed by Scopus, 404 Fourth Ave., New York 10, N.Y.

Leicina was a surprise package from Leitz at the 1960 Photokina. In two models, the 8S with f/2 lens and 16 fps speed and the 8V with an 8-48mm f/1.8 zoom lens, 16, 24 and 32 fps. As of this writing, only the 8S is available, the 8V being expected this summer. This is a battery-operated reflex focusing camera with built-in exposure meter. Single frame. Converters are available for the f/2 lens on the 8S for wide-angle and telephoto effects. Camera has a fade-in, fade-out system and film reverse. Price for the 8S is $259.50. Distributed by E. Leitz, Inc., 468 Park Ave. S., New York 16.

film discussions between engineering or scientific personnel from one plant to another as a visual memo. Time and motion study is an area of possible use, as are demonstration or training films for small groups. In short, the possibilities for using 8mm are available and will probably expand as the inevitable improvements in equipment and materials takes place.

What equipment is now on the 8mm market for possible industrial use? There is no denying that perhaps 2/3 of the 8mm equipment is frankly designed for amateur use. There are, however, cameras which offer some of the versatility, precision and sturdiness needed for use by in-plant people.

Most have varied filming speeds and single-frame shutters. All provide some variation of viewing area, either by a zoom lens or by interchangeable lenses on a turret. All use roll film for more precise positioning in the focal plane, compared with film magazines which have a greater tolerance. All are expensive, in the $200 and up class.

Actually, the cameras shown here are only a sampling of the cameras now offered on the 8mm market. This is an introduction, as it were, to cameras which offer some of the features needed by industrial users. The market for quality 8mm equipment is only just beginning to develop and most likely, new cameras and new models of these cameras will be available shortly. No attempt is made here to evaluate or judge the cameras. This can best be done by a visit to a good supply house and, perhaps, trial periods for promising models. As with any type of equipment, the needs of the individual user determine, ultimately, the choice of what will be bought.

Unfortunately, 8mm has the stigma of being considered amateur equipment, not worthy of professional hands. This situation parallels to some degree the conditions in still photography when the first miniature cameras were introduced during the early thirties. And, at one time, even the 4 x 5 was considered an amateur size compared to the 5 x 7 and 8 x 10 cameras carried proudly by sway-backed professionals. This stigma can be removed as equipment gets better and as photographers learn to use 8mm and turn out films which are, if not equal to 16mm, at least within acceptable tolerances for screen quality.—THE END

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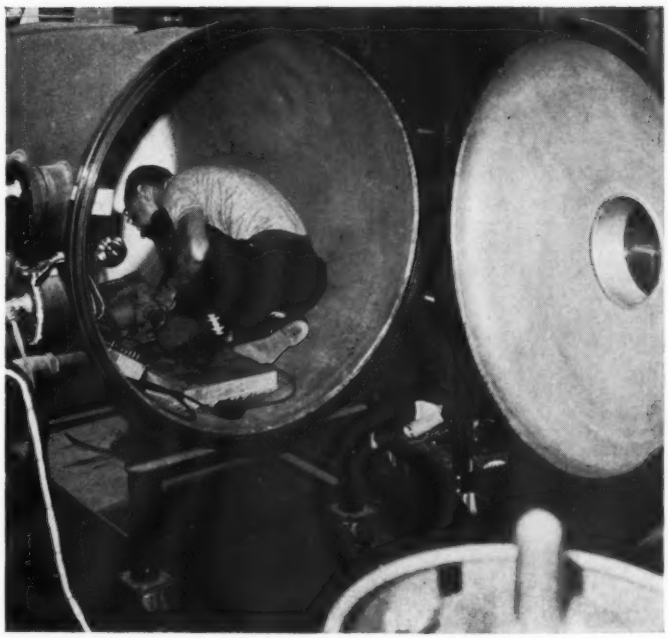
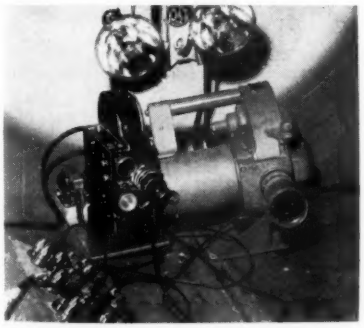
VACUUM PACKED MOVIES

A chamber at Space Technology Laboratories, Inc., was evacuated to simulate conditions at 45 miles up. Object: a test for a space device. E. W. Grueneberg, called upon to photograph the test, finds that space is full of photo problems



A foretaste of the photographic problems in outer space was a dubious fringe benefit for an in-company photographer recently. E. W. Grueneberg, Instrumentation Photographer at Space Technology Laboratories, Inc., Los Angeles, reports two big problems in making motion pictures in a space chamber —even if the photographer is outside looking in—the evaporation of lubricants raises havoc with camera bearings and makes film as brittle as the hair in the "before" half of a shampoo commercial. Mr. Grueneberg offers the following report:

"An engineer at STL asked for motion picture coverage of a test in a vacuum chamber which simulated conditions at 45 miles altitude. The look-in hole of the chamber was badly situated for both shooting and lighting, so arrangements had to be made to mount the cameras and lights inside. A high-speed (approximately 1000 fps) shot and 64 fps shot were requested.



Close-up of camera and light arrangement ready for action in chamber.

"The engineer informed me that DC motors would not work in the near-vacuum of the chamber. Because I had once built a quick rig for shooting time-lapse with a Bolex, I arranged to have a plate made holding the Bolex and a solenoid so that a switch outside the chamber could activate the solenoid which would pull the camera switch to the run-out position. This eliminated the necessity of an electrical motor for this camera, because I could rely on its spring motor. The elimination of one heat-creating motor was desirable because the low density air in the chamber was ineffective in dissipating heat by convection.

"The Fastax 1-in. lens covered a close-up of the event adequately, and a larger field was covered with a 16mm lens on the Bolex. Both cameras were 22½ in. from the event.

"Two GE Par 38 lamps clamped to small vertical stands slightly above and behind the cameras threw about 7000-ft. candles on the event area. The lamp company and vacuum chamber engineers were concerned about two potential sources of trouble. The GE engineers anticipated arcing across terminals and the vacuum chamber engineers anticipated inadequate heat dissipation. It was finally determined that while ionization would be a problem in a partial vacuum, the relatively high vacuum in this chamber would provide, in fact, an insulator between terminals. The relatively short time the lamps would be burning (7 or 8 sec.) would not cause troubles regarding lack of atmosphere for conduction or convection of heat. No one seemed concerned about the lamps exploding in the low pressure atmosphere.

"After a few phone conversations with Ray Grant at Eastman Kodak, it became apparent that film problems might be the most troublesome. ECO was to be used in the Bolex and SO 270 (ERB) in the Fastax. It would take 48 hours to evacuate the chamber to the desired 235,000-ft. altitude (35 u pressure), during which most of the moisture and plasticizer would be removed from the film, causing extreme brittleness. The initial torque of the high-speed camera would possibly

(*Continued on page 64*)

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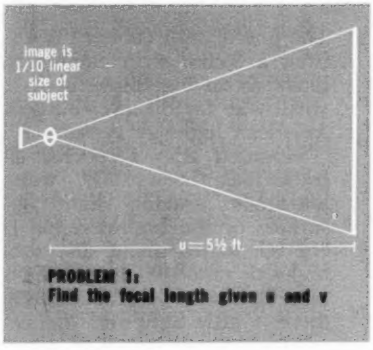
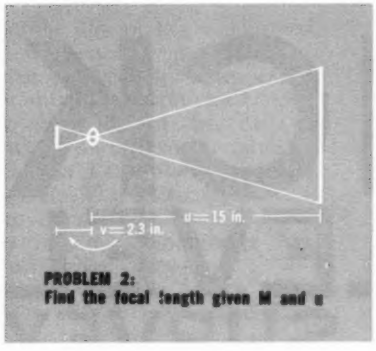
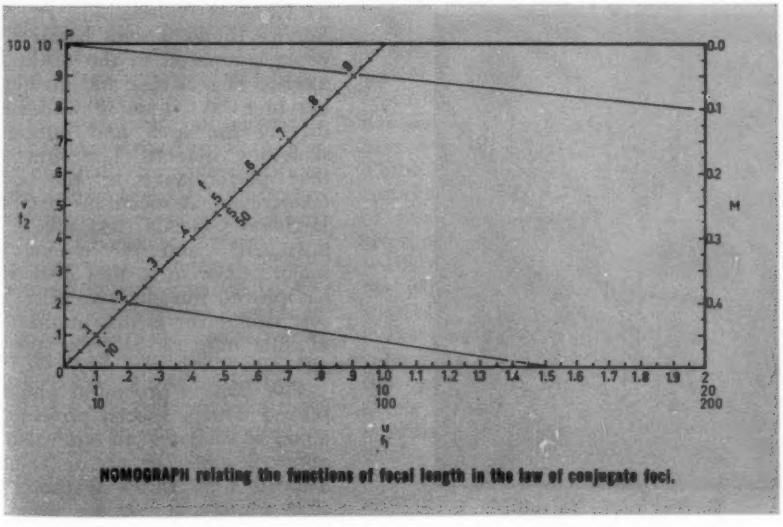
HYZER ON HIGH SPEED

William G. Hyzer presents a new nomograph to stomp out arithmetic in calculating the required focal length, magnification, lens-to-film distance etc., etc.







NOMOGRAPH relating the functions of focal length in the law of conjugate foci.

Recurring all too frequently in optical and photographic calculations is the familiar formula:

$$\frac{1}{f}=\frac{1}{u}+\frac{1}{v},$$

or its two modifications:

$$\frac{1}{u}=\frac{1}{f}-\frac{1}{v} \text{ and } \frac{1}{v}=\frac{1}{f}-\frac{1}{u}.$$

Finding the reciprocal of the sum of two reciprocals is a troublesome calculation to perform quickly by ordinary means because it involves a sequence of mathematical manipulations including both division and addition or subtraction. The nomograph below has been designed to make this calculation simple and straight forward.

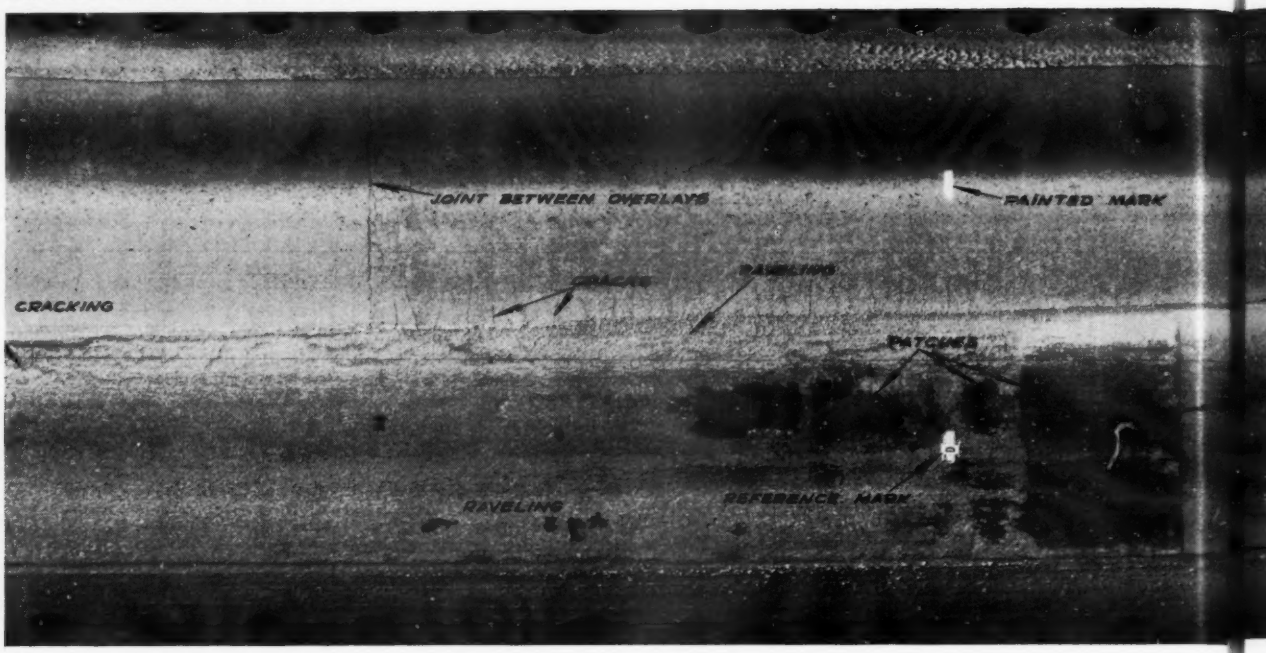
To illustrate, let's determine the focal length f of a lens if the object distance u is 15 in. and the image distance v is 2.3 in. First, draw a straight line between $u = 15$ in. and $v = 2.3$ in. Then, where this line intercepts the diagonal reference line, read off the value of f. In this case $f = 2$ in.

The same technique may be applied to determine the combined focal length f_c resulting from two lenses having individual focal lengths f_1 and f_2 by the relation

$$\frac{1}{f_c}=\frac{1}{f_1}+\frac{1}{f_2}.$$

Problem 2: In this example we know the combined focal length $f_c = 2$ in. and focal length $f_1 = 15$ in. What is the value of f_2? To solve, draw a straight line between $f_1 = 15$ in. and $f_c = 2$ in. on the f scale to obtain $f_2 = 2.3$ in.

When u is large compared to v and f, which is quite frequently the case, the vertical scale for image magnification M appearing at the right hand side of the chart may be used for improved accuracy. Focal length f under this condition is determined as a factor of v. For example, if the object distance u is 10 times the image distance v (magnification = 1/10), what is the focal length? Draw a line between the origin (point P) and $M = .10$. We find that the focal length f is .91 v or .91 M x u = .091 u. So, for an object distance of 5.5 feet, the focal length becomes .091 x 5.5 = 0.5 ft. or 6 in.—THE END



film winds as fast as the road in this

QUICK LOW-LEVEL HIGHWAY SURVEY

Shock-free camera mount

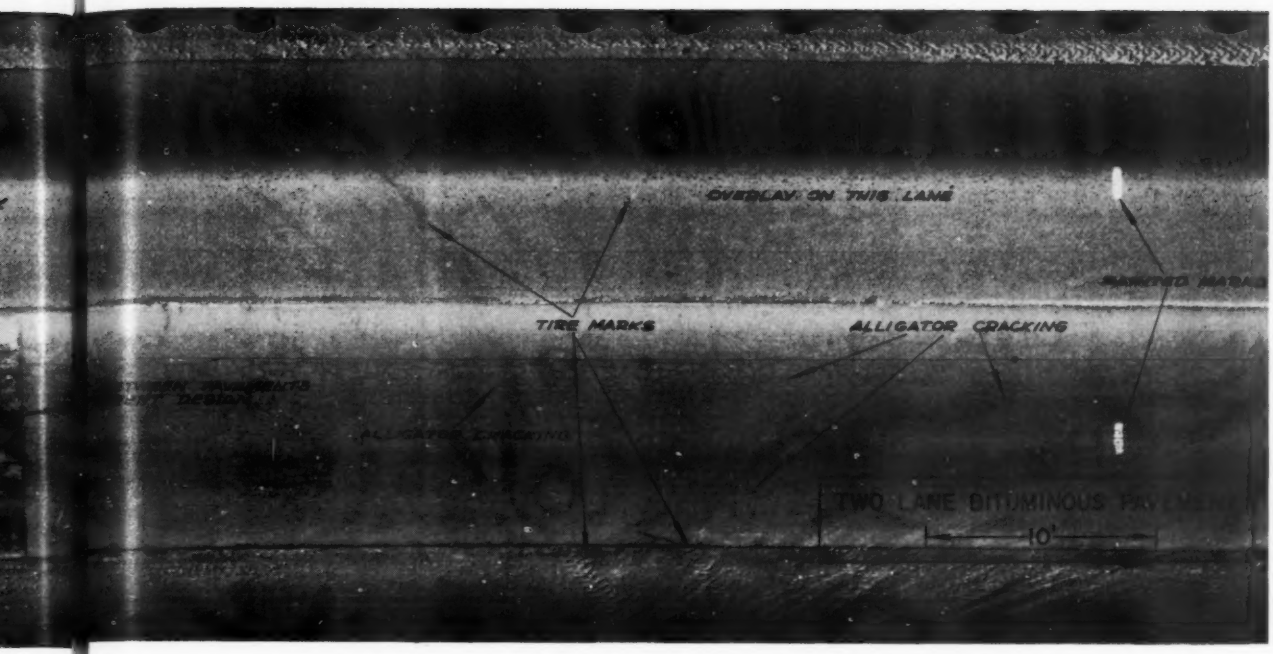
Sur/Fax ready to roll

The photograph (*above*) is a print from a 35mm strip camera that's likely to do big things in its own small way for the ever-burgeoning American highway system.

Mounted atop a specially-fitted truck that throws 9687 watts of low-angle "grazing" light on the surface of the highway, the camera condenses about 2½ miles of highway onto 400 ft. of film in 7 min. It is used late at night when there is little light and traffic.

The system is called Sur/Fax and the vendor is the Aero Service Corp. of Philadelphia, Pa. Aero Service thinks it wins hands down when compared to the traditional method of studying and inventorying highways, namely walking or driving the area and noting or sketching defects. The firm says that performance at the AASHO (American Association of State Highway Officials) test area in Ottawa,, Ill., and in coverage of major test areas in New York State has proved the idea's validity. The cost difference is also impressive: $25 per mile vs. $150 for the old method.

The film is processed and displayed with a special projector at a cub scout pace (an equivalent of about 2 mph) or up to 30 mph. The 10 x 10 throw is useful for staff conferences or for presenta-



tions to purse-string-holders such as state legislators or administrators. For more detailed, engineering-type analysis, the image is inspected on the viewing screen of a 3M Reader-Printer. When the film shows cracks, scale, spalling, faulting, alligatoring, raveling, rutting, settlement or bleeding—bumps as far as the average motorist is concerned—the Reader's reader presses a button and gets an 18 x 24 positive print in a matter of 30 sec. This leads to all sorts of efficiencies, including automatic collection and computer processing of basic highway condition data—which Sur/Fax makes practical for the first time—according to Aero Service engineers.

The camera is a continuous-recording 35mm strip Aero Path, designed originally for flight position data in connection with airborne magnetometer surveys. It has been adapted in several ways.

The camera is mounted 14 ft. above the highway surface in order to get the maximum coverage, yet fit overpass clearance minimums on most state highways. In order to cover 12 yds. of highway width in a single traverse from that height, Aero Service assembled a 120° retrofocus wide-angle lens from existing components. To maintain center sharpness across the image, the film platen was curved. Scale was another problem with the strip-type camera because film travel must be proportionally related to the speed of the truck. A fifth wheel on the truck establishes vehicle travel and operates a servo mechanism. This fluctuates the voltage to the 24V DC motor which drives the film to synchronize driving and camera speed.

Camera vibration at the 20 to 30 mph picture taking speeds is overcome by a) mounting the camera on gimbals and b) suspending it with long, high-inertia arms.

A gasoline-powered generator within the truck supplies 10kw of power to the 16 lights used for texturing the highway. There are five 399-watt 115V 60-cycle sealed beams on each side of the truck. Three more are mounted at the camera to furnish a near minimum of shadow fill. In addition, there are three quartz line lamps of 1500 watts each. They operate at 277V 60-cycle and are mounted in cylindrical reflectors.

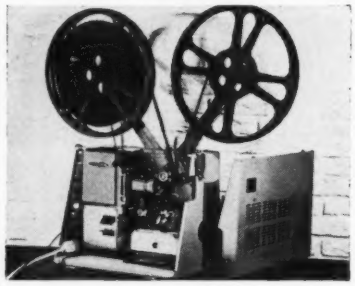
Practically speaking, the strip camera photographs only a 36-ft. line across the highway at any given instant. Therefore all this lighting can be aimed rather precisely. By experiment Aero Service was able to get the best "mix" to most fully reveal the condition of the road at the line being photographed. This meant placing the majority of the lights low, and then shielding them to avoid blinding oncoming traffic. The photography is done from 1 to 5 a.m. to further avoid this catastrophe.

Aero Service's Homer Jensen estimates that the average exposure is equivalent to about f/8 at 1/50 sec., using Plus-X film, the favorite for this work. He says that a final determination of resolution for the system has not as yet been made, but that it is "pretty damn good"; something in the neighborhood of 34 lines/mm while the truck is breezing along.

Some of the other possibilities which Aero Service sees for Sur/Fax are inventory of railroad and subway roadbeds, bridges and airport pavements. Basically a photogrammetric engineering outfit, its research labs are humming with projects involving "automatic devices for gathering data for sufficiency rating systems, for highway inventories and for parking studies. These systems combine photographic sensors, micro-wave distance measuring devices and data reduction equipment."

None of them however is likely to reveal a way to get a quick cup of coffee at one of those super highway refectories.—THE END

ELIMINATE COSTLY FILM DAMAGE



Safety Film Trips, exclusive with Kalart/Victor, automatically stops the projector in emergencies.

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Ernest E. Reshovsky

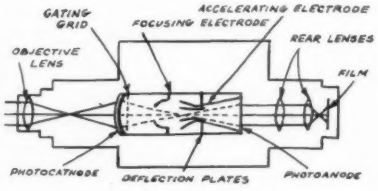
PHOTO INSTRUMENTATION

Optical to electronic to optical conversion: speed and sensitivity

We had a talk with Dr. George L. Clark, a member of the technical staff of Space Technology Laboratories, Inc. (STL). He is attached to the Micro-millimeter Wave Electronics Section of STL's Research Laboratory Div., and has been instrumental in the development of the STL Image Converter Camera.

How it works

Said Dr. Clark: "The principle of an Image Converter Camera is in converting the optical image to an electron image. This permits electronic shuttering, light amplification and image deflection. Conversion of the light image into an electron image is done by focusing the optical image on an image converter (I.C.) tube. The focused light strikes the photo cathode of the tube, thereby effecting the conversion into an electron image. The electrons carrying the picture information move toward the anode,



where they cross over and are accelerated to focus on a fluorescent screen at the end of the tube. The optical image is thus recreated at an amplified intensity on the screen. The amplified image on the screen is finally photographed with a camera and film. A gating grid behind the photo cathode in the path of the electrons serves as an electronic shutter. Varying the duration of the electric voltage pulse to the gating grid provides a range of exposure times. They are changed by a switch on a control panel.

"A series of exposures on a single photograph can be made by deflecting the electron image to different positions on the fluorescent screen just before pulsing the control grid and holding the image at each position during exposure.

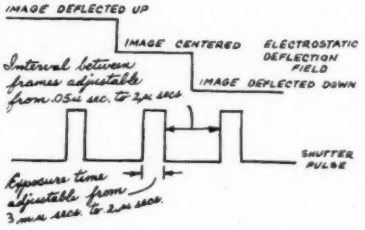
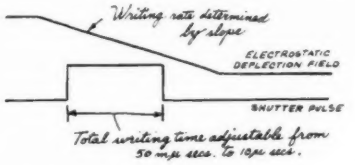


IMAGE DEFLECTED UP
IMAGE CENTERED
ELECTROSTATIC DEFLECTION FIELD
Interval between frames adjustable from .05μ sec. to 2μ secs
IMAGE DEFLECTED DOWN
SHUTTER PULSE
Exposure time adjustable from 3 m.μ secs. to 2μ secs.

"In streak operation the gating grid is pulsed to a positive potential for the duration of the exposure. The image is swept across the fluorescent screen at a uniform rate by


Writing rate determined by slope
ELECTROSTATIC DEFLECTION FIELD
SHUTTER PULSE
Total writing time adjustable from 50 m.μ secs. to 18μ secs.

applying a linear sweep voltage to one deflection electrode while the other is held at a fixed potential. Varying the linear sweep rate of the applied voltage provides for a choice of writing speed."

Performance

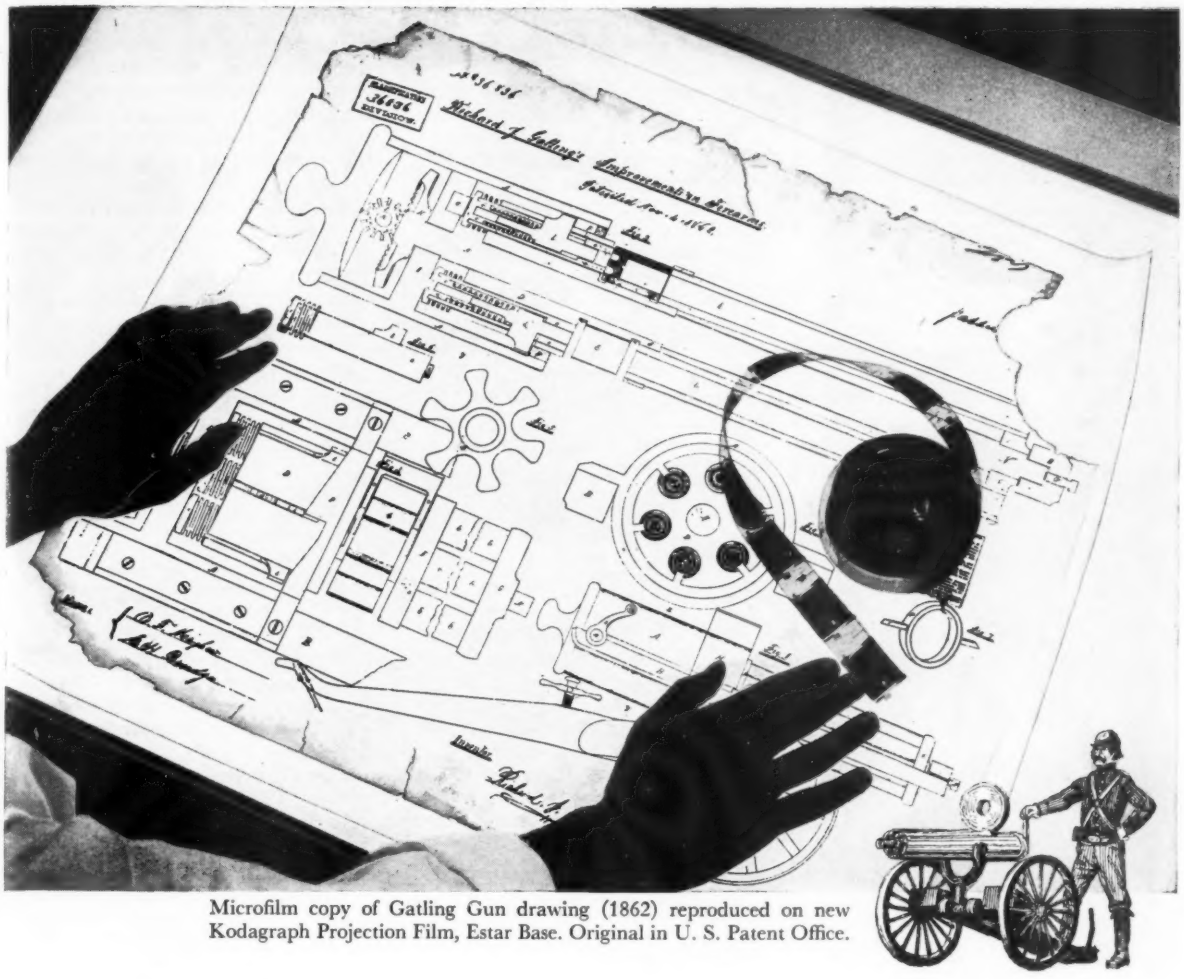
Dr. Clark told us briefly about the development of this camera.

About three years ago, in the course of research of fusion physics at STL a need developed for an ultra-fast camera capable of exposure times on the order of 10 millimicroseconds (which is 10 billionths of a second).

Dr. Clark investigated available high-speed cameras and the advantages of the relatively new I.C. tube concept in camera design.

Kerr cell cameras had dominated the field of ultra-high-speed photography, but Dr. Clark found the I.C. tube to have distinct advantages over the Kerr cell.

(*continued on page 62*)



Microfilm copy of Gatling Gun drawing (1862) reproduced on new Kodagraph Projection Film, Estar Base. Original in U. S. Patent Office.

Big Blowup from microfilm!

New Kodagraph Projection Film, Estar Base, produces change-in-scale intermediates that will stand up under the heaviest use in drafting room or print-room.

Blowups from microfilm—or reductions of drawings and maps—are remarkably sharp and clean on a whiter base that has a "built-in" longer life.

Production is easy. This new high-contrast, quick-processing film can be exposed in enlarger, projection printer, process camera . . . and handled with "1A" safelight. Wide latitude all but ends make-overs.

See this versatile new Kodagraph Film—and the others in the new *Estar Base line:* Kodagraph Contact Film; Kodagraph Autopositive Film.

All combine reliable Kodak emulsions on the new Estar Base—highly translucent, durable, and dimensionally stable, with excellent matte surface on both sides for easy drafting. Available in standard drawing sheet sizes and in rolls up to 52 inches wide. Call your local Kodagraph Dealer, or write Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y.

NEW! **Kodagraph**

REPRODUCTION FILMS

for better line-for-line reproduction

Kodak TRADEMARK

POLARIS PROJECT

uses Milliken Cameras

TIME: Now
PLACE: N.O.T.S. Sea Range at San Clemente Island, California
EVENT: Underwater Polaris Launching; water visibility to 35 ft.
DATA: Missile altitude and velocity, cavitation effects and time history.
EQUIPMENT: Milliken D.B.M. 4A camera with 5mm wide angle lens. Milliken Underwater Camera Housing. Exposure 1/2000 second, 400 f.p.s.

Precision Milliken 16mm cameras utilize a dynamically balanced intermittent movement with register pin to produce highest quality pictures under abusive environments. These cameras, which are available in 100, 200, 400, & 1200 foot capacities, attain up to 400 fps speeds under 50G acceleration and vibration loads, in —65 degrees F. temperatures and altitudes up to 250,000 feet.

D. B. Milliken Company
Photo Instruments of Precision

dbm

For information Write: D. B. Milliken Co. 131 N. 5th Ave., Arcadia, California

Get more information. Circle 464, page 73

PHOTO INSTRUMENTATION

(*continued from page 60*)

Exposure times for I.C. cameras are shorter. 2-3 milimicroseconds for the I.C. camera vs. about 5 millimicroseconds for the Kerr Cell.

Framing rates for I.C. cameras can be as fast as 20 million per sec. The Kerr cell does not repeat; rotating mirror cameras can be run as fast as 28,000 fps.

I.C. cameras can be used at streak rates of 1 meter per microsecond. Kerr cells don't streak and rotating mirror cameras achieve streak rates of about 8mm per microsecond.

In the field of light transmission the I.C. camera scores heavily. It actually amplifies light input by about 50 times, while the transmission of an efficient Kerr cell is on the order of 10 per cent; about 90 per cent of the light being absorbed by the cell itself.

In view of these advantages Dr. Clark developed the STL Image Converter Camera, which has exposure times adjustable from 3 millimicroseconds to 200 millimicroseconds (i.e. .2 microseconds), is capable of taking three frames at intervals from .05 millimicroseconds to 2 microseconds by electrostatic deflection of the image within the I.C. tube.

Resolution of the camera is 22 lines/mm at 20 millimicrosecond exposures and 14 lines/mm with exposure times of 2 to 3.5 millimicroseconds.

For an objective lens Dr. Clark looked for a fast lens of approximately 5-in. focal length, which would be very well corrected over the narrow blue spectral range of 3500-5500 angstrom units emitted by the I.C. tube. In his decision he was not concerned with chromatic abberation. He finally decided on a Carl Meyer Anastigmat, 125mm, f/2 as best suited for the purpose.

For the rear optical system, where the image apearing on the I.C. tubes fluorescent screen is recorded on film, he chose two lenses mounted front to front: a Schneider Xenon, 125mm, f/2 and a Carl Zeiss Biotar, 75mm, f/1.5. This system works at f/1.5 and at a reduction ratio of 5:3.

The STL Image Converter Camera records on either 2¼ x 3¼ sheet film or on a Polaroid back which takes the standard Polaroid 3¼ x 4¼ picture roll. For low-luminosity photography the high speed of ASA 3000 of Type 47 Polaroid film and its instant availability make this material very useful for lab use.

An interesting feature of the STL I.C. camera is the use of four interchangeable plug-in units which form the top of the camera. These modules make possible fast low inductance connections and very simple switching over all ranges of operation of the camera.

The High-Speed Framing Unit provides for three frames, exposure times of 5, 10 and 20 millimicroseconds; independently adjustable intervals of 50, 100, 200, 500 and 1000 millimicrosecs.

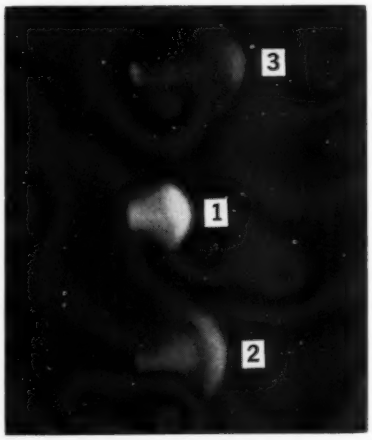
The Standard Speed Framing Unit gives exposure times of 50, 100 and 200 millimicrosecs. with intervals of .2, .5, 1, 2, and 5 millimicrosecs.

The High Speed Streak Unit has writing times of 50, 100, and 200 millimicrosecs.

The Wide Range Streak Unit writes at times of .5, 1, 2, 5 and 10 microseconds.

Applications

Even at this relatively early stage in the development of the I.C. cameras many applications are pretty clearly indicated, and we are sure more will be developed as the camera is being used in more laboratories. Plasma physics, hypervelocity ballistic research, shock tube work with events of 1 microsecond and less duration, gas dynamic studies and wind tunnel research at re-entry speeds are just some of the applications for this new research instrument.—THE END

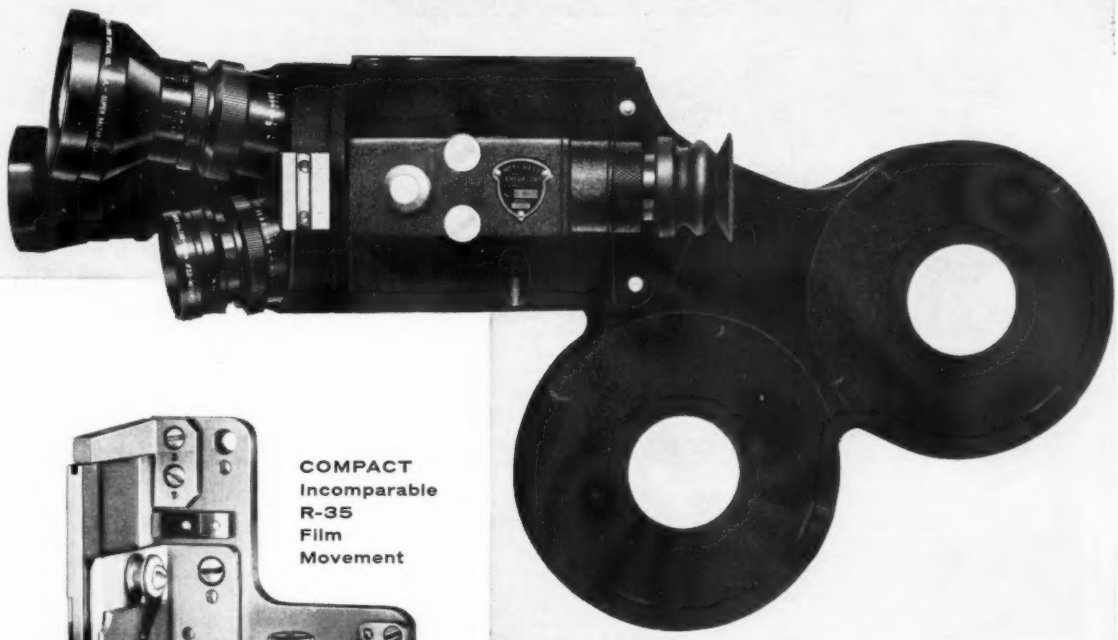


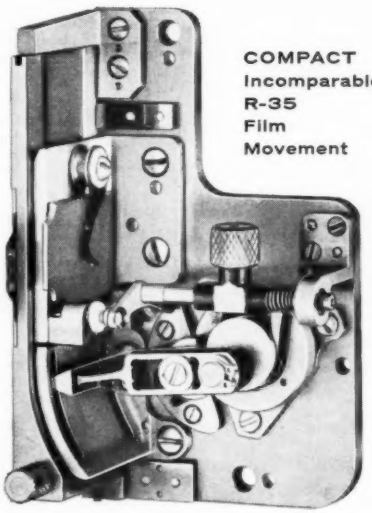
Frame pictures of shock wave emerging from a small tube and entering a larger tube. The primary shock wave pushes hot gas straight out of the smaller tube, but also gives rise to a secondary spherical shock wave. Exposure times, 45 nanoseconds. Framing interval, 0.5 microsecond. The center picture is the first, the lower one second, and the top picture third.

NEW MITCHELL R-35

...only truly professional portable reflex motion picture camera

Designed to cover the widest range of professional motion picture applications, the all new Mitchell R-35 reflex camera offers remarkable versatility to exceed the requirements of most discriminating cinematographers. Streamlined design is combined for the first time with the full range of professional features by Mitchell—world's leading source of truly professional motion picture cameras and equipment.





COMPACT
Incomparable
R-35
Film
Movement

Designed to produce rock-steady films completely compatible with those of the well-known Mitchell BNC, NC and Standard cameras, the new R-35 dual register pin movement features: Twin registration pins... twin pull-down claws; stop-motion to 120 F.P.S.; removable aperture plate with built-in filter holder slot... holds two thicknesses of gelatin filters. Full size: 0.980" x 0.735", removable pressure plate, entire movement removable for cleaning... special construction insures foolproof insertion with no loss of timing.

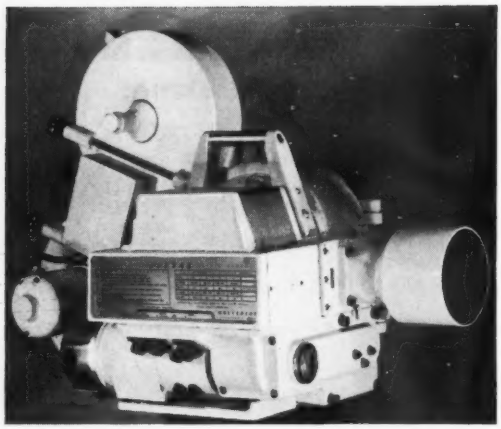
Hand Held or Tripod Mounted, the new Mitchell R-35 reflex camera uses a new series of Super Baltar matched lenses designed specifically for the R-35 by Bausch & Lomb. For Complete details of the outstanding features of this remarkable 35mm camera, write for the new R-35 Bulletin.

MITCHELL R-35

MITCHELL CAMERA CORPORATION
666 W. HARVARD ST., GLENDALE 4, CALIF.
TECHNICAL REPRESENTATIVE:
521 FIFTH AVE., NEW YORK 17, N. Y.

Get more information. Circle 465, page 73

WF-8A . . . Newest Model in *FASTAX* Family of 28 High Speed Cameras!



- Pushbutton speed selection.
- Rotating prism and high efficiency co-axial drum shutter.
- Rapid acceleration; flat speed curve within ±4% selected rate.
- Three optically projected Fiducial Markers.
- 400' daylight magazine, standard 35mm film; negative or positive perforations.
- Thru-the-lens viewfinder . . . boresight available for metric work.
- 3¾" f/2.5 standard lens. Others available.

You get truly superb resolution—blur-free pictures at highest speeds—with the WF-8A 35mm Full Frame Metric High Speed Camera.

And so easy to use! No changing of motors and gears for different speeds, because unit is completely self-contained. Just load up and shoot at any of 8 speeds from 200 to 2000 p/p/s. You'll see more detail on the film than ever before . . . in full frame size!

Other Models of *FASTAX* High Speed Motion Picture Cameras

8mm CAMERAS
- WF-1—100' Motion Picture
- WF-2—400' Motion Picture
- WF-2S—400' Motion Picture Stop-start
- WF-15—400' Combined Motion Picture-Oscillo-Streak
- WF-15S—400' Combined Motion Picture-Oscillo-Streak Stop-start
- WF-21—100' Combined Motion Picture-Oscillo-Streak

S—Stop-start

16mm CAMERAS
- WF-3—100' Motion Picture
- WF-3T—100' Motion Picture
- WF-4—400' Motion Picture
- WF-4T—400' Motion Picture
- WF-4S—400' Motion Picture Stop-start
- WF-4ST—400' Motion Picture Stop-start
- WF-6—100' Oscillo-Streak
- WF-14—400' Combined Motion Picture-Oscillo-Streak
- WF-14T—400' Combined Motion Picture-Oscillo-Streak
- WF-14S—400' Combined Motion Picture-Oscillo-Streak Stop-start
- WF-14ST—400' Combined Motion Picture-Oscillo-Streak Stop-start
- WF-17—100' Combined Motion Picture-Oscillo-Streak
- WF-17T—100' Combined Motion Picture-Oscillo-Streak
- WF-22S—400' Oscillo-Streak, Stop-start
- WF-23—400' Oscillo-Streak

35mm CAMERAS
- WF-5—100' Motion Picture, ½ Frame
- WF-7—100' Oscillo-Streak, ½ Frame
- WF-8—500' Motion Picture
- WF-8A—400' Motion Picture Metric Camera
- WF-9—100' Combined Motion Picture-Oscillo-Streak
- WF-10—400' Oscillo-Streak, ½ Frame
- WF-18A—400' Oscillo-Streak Version WF-8A

T—"T" Series—increased resolution, stopping action, frame height.

ACCESSORIES . . . A complete High Speed Motion Picture taking laboratory is available

FASTAX GOOSE CONTROL UNIT
The control unit consists of a variable AC transformer capable of outputs up to 280 volts which permits maximum operating speeds. In addition, a set of electrical timers make possible synchronization between the camera and event being photographed.

HIGH INTENSITY XENON LAMP
with Control Console. Portable, rugged, highly efficient. Operates from low voltage DC supply . . . has high percentage of light collection, and color is exactly comparable to daylight. Pictures can be taken as fast as 16,000 pps on color film ASA8.

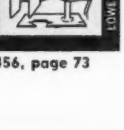
Write *for more detailed information on these Fastax Cameras and accessories.*

WOLLENSAK OPTICAL COMPANY • ROCHESTER 21, N. Y.

Get more information. Circle 497, page 73

Impossible location. Dark office, smooth walls, no stands, 10 min. to light. Taped 1st light on wood panel for key; 2nd on plaster beam for top light; set 3rd on shelf for back light; hung 4th on door hinge for background light; clamped 5th on tripod for fill. Time: 9½ minutes! Used Lowel-Light Kit — of course.

HOW TO SHOOT A V.I.P.



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Kit: 5 lights, Gaffer-Tape, case $29.95
Pocket size, folding Barndoor $5.75
AVAILABLE AT LEADING PHOTO DEALERS

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Get more information. Circle 478, page 73

VACUUM-PACKED MOVIES

(*continued from page 55*)

snap the film at the start, resulting in no picture and a real jam. No trouble with picture quality due to drying of the emulsion was anticipated, if the film did make it through the camera.

"So, with thoughts of lights blowing up or terminals arcing, camera bearings drying up like Mohave dogwood, film shattering to powder-like bits and lens elements cracking, we set the cameras and lights in the tank, wired them to inside terminals connected to outside switches and powder, focused and framed the cameras and loaded them up. After the test to be photographed was set up and checked, the door was closed and the vacuum unit turned on. This was on a Saturday morning. The engineer looked in the window to see if any wires were fluttering around and, after a few minutes, said that everything was all right and that we could go home. I left with the same feeling a mother must have leaving a sick baby in an incubator.

"On Monday morning, after a few external power checks, we were set up to go. A 10 sec. to zero countdown was used, the lights going on at six, the Bolex at four, the Fastax at two, and the event at zero. All seemed to go well. The lights lit. We could hear the sounds of solenoid and cameras. In 5 sec. the job was done. The vacuum chamber was restored to atmospheric pressure in a matter of minutes.

"I climbed into the chamber and opened the Fastax door. The film was exactly as I had left it. Not an inch of film had traveled through the gate. My first thought was that the vacuum had affected the motors. A quick second look showed the cause of the failure. In drying up, the film had curled to such an extent it had pulled away from the microswitch, automatically turning off the camera during the evacuation of the chamber. I gnashed my teeth a bit while Roy Niles checked the Bolex. He tried to run off more film to protect the event footage and found the spring-wind labored excessively even at 24 fps. The curl of the film seemed to be binding the sprockets. We decided to send this roll in for processing and put a fresh roll in each camera for the next test. The microswitch had to be removed from the Fastax to avoid recur-

(*continued on page 88*)

THE TEST:
Radiographic Examination, Consolidated Edison Atomic Generating Station

THE SOURCE:
Iridium 192

THE MATERIAL:
Weld joints of 20" Diameter Chrome Molly Pipe

THE FILM:

GEVAERT STRUCTURIX D7 X-Ray Film

Gevaert Structurix is specified where optimum penetration is needed, as in a recent gamma ray examination by N. Y. Testing Laboratories, Inc. Shooting was conducted through two walls (1.021" sw) to complete a 100% examination of the total weld area of 20" diameter chrome molly high pressure steam pipe in accordance with MIL-STD-271A requirements.

In laboratory or field, industry increasingly calls for Gevaert Structurix films for a probe in depth of structural quality. In their test for hidden flaws, these films search deeply, offer greater readability and have a sturdy base that facilitates handling.

Gevaert Structurix Films are available in five types, each designed to excel in its specific job application. Your inquiry for complete details and professional samples will be answered by the Gevaert branch office nearest you.

FREE! *Write for handy Exposure Calculator for either Co 60 or Ir 192 Radiography of Steel. Specify the one desired!*

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FLAT

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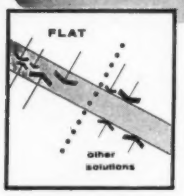
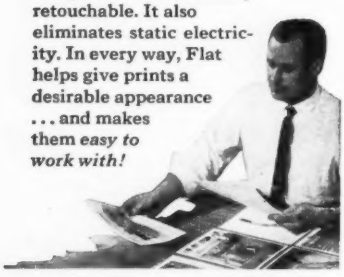


Curl is prevented by an entirely new method. Flat penetrates into the paper, joins with the paper molecules in such a way as to prevent curling, shrinkage, or dimensional changes due to variations of humidity. No new processing equipment is required!

OTHER FLAT PROPERTIES

Prints have a desirable flexibility. Flat leaves no brittle coat. Flat imparts a better gloss to the print, and prints are more easily retouchable. It also eliminates static electricity. In every way, Flat helps give prints a desirable appearance . . . and makes them *easy to work with!*



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Get more information. Circle 492, page 73

PMI IN-PLANT REPRODUCTION

Herbert P. Paschel

GRAPHIC ARTS

Reader questions: how to reshape graphs, shape up stripping film

A reader poses an interesting problem—how to photograph an original of one size and shape to fit into an allocated space of a different size and shape. He writes, "We have a reproduction problem of adjusting various rectangular graphs to our standard 6 x 9 format. The present method consists of a draftsman redrawing the graphs to the correct format. The thought occurs to us that a variable squeeze anamorphic lens would be useful for this purpose. I would appreciate other suggestions. Is there, perhaps, a more mechanical way of accomplishing this adjustment?"

The use of an anamorphic lens is, of course, one way of photographing the vertical and horizontal dimensions of an original disproportionately. Mechanically, it is possible to alter the shape and dimensions of a photographic image by deliberate, controlled distortion. This is accomplished by means of special process cameras which permit tilting and twisting the focal plane, lens and copyboard separately at various angles in respect to the normal optical axis.

Such cameras are variously called "distortion cameras," "reproportioning cameras," and "modification cameras." In addition to being able to elongate or shorten either height or width while the other dimension remains unchanged, both dimensions may be changed non-proportionately. It is also possible to achieve curved, wedged, slanted and other effects. The full gamut of "tricks" requires the use of liquid-filled cylindrical lenses and prisms and an assortment of preformed shapes to provide the necessary contour to either the sensitive film or the copy.

The distortion procedure and equipment is used extensively to modify type matter and layouts and many unique and distinctive effects seen in advertising are often produced in this manner. The accompanying illustrations give some idea of the effects possible. This technique might possibly be applicable to your problem. I suggest you contact the following manufacturers for detailed information:

Robertson Photo Mechanix, Inc.
(Distortion Camera, Model CDD)
7440 Lawrence Ave., Chicago 31. Ill.

Modi-Graphic, Inc. (Fotomaster Camera)
215 E. 9th St., Cincinnati, O.

Graphic Arts Research Foundation
(Clydesdale Reproportioning Camera)
112-114 W Kinzie St., Chicago 10, Ill.

There are a number of service organizations who possess such equipment and will perform re-proportioning work. In New York City you might contact one of the following organizations:

The Film Font 832 8th Ave.

Flexo-Lettering 350 E. 46th St.

Martin J. Weber 171 Madison Ave.

A reader has a problem in using Kodalith Stripping Film in 5 x 7 film holders. He writes, "the thin film buckles in the holders consequently throwing our negatives out of focus. We tried to hold them down in the center by using a little stayflat solution in the holder. This helps to a degree. We would appreciate any suggestions."

The problem is obviously due to the fact that the film in question is not stiff enough to lie flat when used in a film holder. This situa-

Typical reproportioning with right angles preserved. Courtesy of Modi-Graphics, Inc.

tion is further aggravated when the film is cut from rolls and assumes a convex curl when inserted in the holder.

The first of a number of possibilities is to switch from film to plateholders. The latter can be used in a number of ways. The stripping film can be sandwiched between two thin sheets of glass and this laminate loaded in the plateholder. The rear member need not be glass. A thin sheet of metal, plastic, stiff cardboard, etc., may be used instead providing the material is perfectly flat. Resilient materials such as felt, rubber sheeting, sponge rubber, polyfoam, etc., are likewise satisfactory. The use of a glass plate in front of the film has two decided disadvantages. First is the fact that the glass will attract dust, and unless this is carefully removed when loading the holder, negatives will have more than the usual number of pinholes. The cover glass changes the focal plane within the holder and this will require an adjustment in focus to compensate for the thickness of the glass. This is no serious problem unless the cover glass varies in thickness for the different holders in use.

An alternate procedure which eliminates the dust problem is to coat a piece of glass of appropriate thickness with stayflat solution. The film is attached to the sticky surface and the combination placed in a plateholder.

If you can tolerate a slight loss of image area, another satisfactory method is available. In this case you make a number of masks out of metal with, let us say, an opening of 4 in. x 6 in. The 5 x 7 film is sandwiched between the mask and a stiff backing material and loaded in a plateholder. The ½-in. margin on all sides will probably be sufficient to hold the film flat. Again, you may have to make some compensation in focus.

You could also have special holders built which would permit holding the film firmly in place during exposure by vacuum.

Another avenue to explore concerns the film. If your volume of consumption is large enough, some film manufacturers would consider coating a film to your specifications —in this case, on a heavier base.

I am assuming, of course, that you have some reason for wanting to use the film in a holder. But if none of the above are practical solutions to your problem, you will have to consider changing equipment.—THE END

EASY FAST INEXPENSIVE
PLATEMAKING
MODEL RP-17
$298
17" x 23"
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$99
23" x 28"
Rapid Printer
PLATEMAKERS
Ideal for small offset plates and duplicating masters. Vacuum frame is on top, powerful carbon arc lamp in the base. Makes perfect plates every time as only a carbon arc lamp can, and clean, simple operation makes it the perfect machine for office and in-plant reproduction departments.
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Feature: highly polished, chromed, machined steel straight edges on all sides, adjustable; ceramic glass top; softly diffused fluorescent light; silver hammerloid baked enamel finish; shipped completely set-up—no crating charges.
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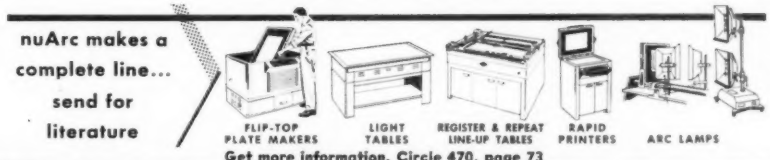

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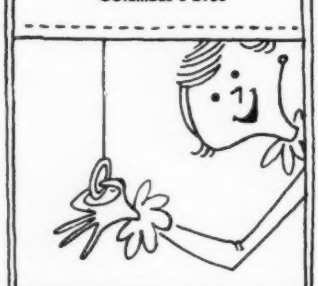

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PMI IN-PLANT REPRODUCTION

Vernon Tate

MICROREPRODUCTION

The knowledge surplus, and what microfilm may do to resolve it

Originals for microfilm are usually on paper on which data have been entered by writing, printing, photography or some other method. Their formats, sizes and conditions vary widely but all are produced to some standards or conventions in order to serve particular purposes. They are, therefore, presumably in some kind of order. If indeed the originals are not in order there is not much point in microfilming them, for they would be as useless as, for example, a collection of miscellaneous unrelated papers bound up in book form. This is not to say that microfilms of this type have not been made, or for that matter that miscellaneous papers have not been brought together and bound. In the Mexican archives many years ago the custodians were greatly perturbed about the condition of some of the records. They procured the services of a detail of soldiers who entered the archival vaults and with scant ceremony packed up quantities of documents that were sorted and arranged only by size. These were forthwith bound up into volumes on this basis. The chaotic consequences over the past half-century could well serve as an object lesson to those who might contemplate the microreproduction of an unarranged file.

Arranging arrangements

In general microreproduction attempts to preserve, as far as possible, the arrangement of the original or to substitute, perhaps by superimposition, some other arrangement that will enable the reproduction to be readily usable for the purpose intended. The amount of attention paid to the details of arrangement is roughly proportional to the amount and kind of expected use.

Some originals are easy. The printed book, for example, through some five centuries of development has emerged in a highly perfected format. There is a title page, usually a table of contents, the pages are numbered and there is often an index. Everyone knows how to read a book whether he often does so or not and the utilization of a microreproduction in the form of a roll of microfilm, a sheet of film (microfiche) a microprint, Microcard®, or even unitized in single pages is merely an easily handled detail. Moreover the efforts of librarians over the years have produced classification schemes, catalog cards and numberless finding aids which render access to books and related materials both easy and convenient. For other kinds of originals, well known and accepted methods of use can generally be transposed into micro formats of rolls, strips, sheets and unit.

Information & survival

Two formidable current problems, which in reality are so closely related that they may be considered as one, are of increasing urgency. Recorded information is now of gigantic proportions and is growing at a stupendous rate. The corollary is that time required to make use of this mass of data efficiently, for some areas at least, has long passed the point of diminishing returns. In some areas of science it is often easier to do a particular piece of research than it is to search the literature in order to discover whether it has already been done and reported. The fact that it is often more fun to do the research project than it is to do the literature search is not without importance. Where "live" records are concerned or where survival may be only a matter of minutes, ordinary measures do not apply. It is therefore only natural that increasing emphasis has been placed on more rapid access to certain kinds of information, and on high-speed data handling.

It is rather interesting to reflect that the two main streams of effort, using microfilm and high-speed

searching to attack access problems that closely resemble similar situations receiving much current emphasis, began in the period shortly before World War II.

The first of these consisted of mechanized unitization. Of several methods that were then in limited or experimental use, the aperture system succeeded in combining the visual and photographic properties of microfilm with punched card data handling methods, particularly those of the IBM system. It was necessary to develop a whole family of equipment including dies for cutting the microfilm into exact units, presses for mounting the units, special adhesives, film printers, reading machines, enlargers and other items. Once a film image was securely mounted in a punched card, all manner of interesting high-speed sorting and control operations became possible. Probably the best exemplification of this method is now found in the Filmsort System, a branch of the Minnesota Mining and Mfg. Co. It is being employed on an increasing scale in a great variety of applications. One of these, the control of engineering documentation including plans and specifications, is expanding with great rapidity. There are many other variations of the same idea. Some intended for individual use or small applications offer hand sorting by needles, notched cards and the like. In some systems the micropaques find a useful place for themselves.

Electronic searching

The other main stream of development involved the "rapid selector." The prototype machine was developed by Dr. Vanevar Bush before World War II. Subsequently another machine on the same general design as that of Dr. Bush was built by Dr. Ralph Shaw.

In the original machine, the basic idea was to incorporate some 72,000 frames of documentary facsimiles, data coded for electronic selection, on a roll of 35mm microfilm 2,000 ft. in length. This represents the equivalent of some 300 cubic ft. of normal files and, in addition, some 430,000 index entries. The coded data were used to locate desired material as the film was passed through a scanning device at a rate of 78,000 codes per min. in the original machine. Apparatus for using the material once located and for making copies followed conventional patterns. The second machine materially increased the capacity as well as the rate of speed of the selector. Both operated satisfactorily and demonstrated the feasibility and validity of the concepts but neither was commercially practicable.

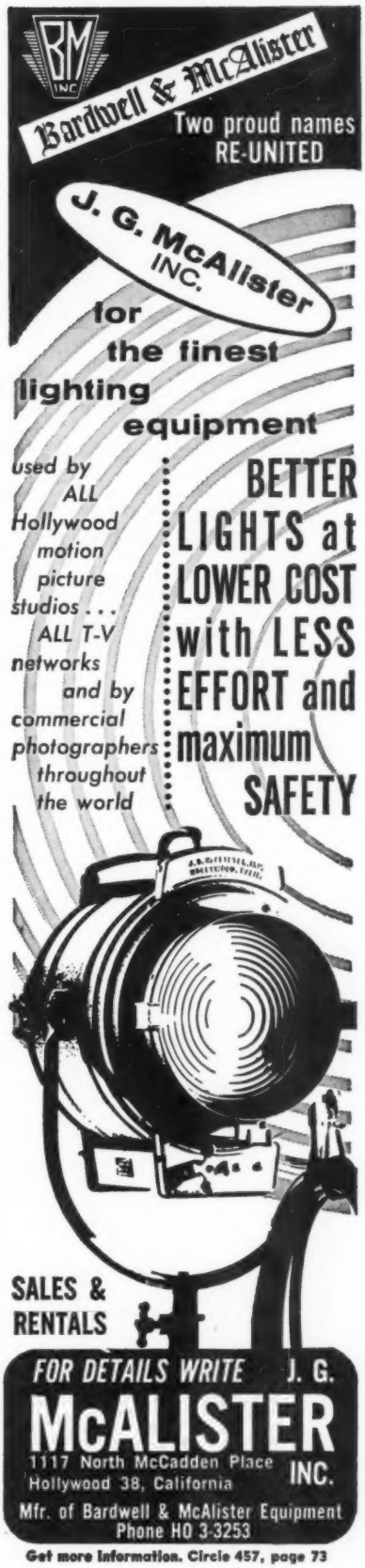
The next major development, a truly marvelous piece of design and engineering, was the Minicard system produced by the Eastman Kodak Co. The Minicard is a filmstrip, it has been called a chip, 16x32mm in size, that in the original machine here outlined can record 12 pages of textual material with room for 49 additional coding characters. The latter are photographed in the form of dot patterns directly on the film. Areas for text and coding can be varied; if the area for coding is increased, that for text decreases. The space compression achieved by high reduction is very great. A standard cabinet filled with Minicards will contain 10.8 million pages of text and 44 million index code characters. Searching is facilitated by storing the Minicards in blocks or magazines. The selector searches from coded input requests on tape at a rate of 1200 per min. Film or hard copy reproductions are available.

Of particular interest is the fact that in order to make the Minicard practicable, a new film which is said to resolve in the order of 1,000 1/mm was developed; new lenses had to be perfected to use with the film. The original negative is not used in searching but is maintained as a permanent record and all searching proceeds from a print.

The cost of a Minicard system is believed to be in excess of $1,000,000 although the existing machines are in government service with the details of cost and operation not generally available. The capabilities and potentialities of the system despite the cost approach the realm of science fiction.

More to come

The year 1961 begins a new decade, and the trends considered in general skeletonized form are only basic background for an entirely new series of developments. By the time that this column is printed it is likely that at least two new high-speed data control systems incorporating microphotography will have been shown publicly. They carry the story of the two main streams of technical development one step forward and several decimals lower in price structure. A discussion of some of the advantages that they allege and some of the problems that they raise will await a future essay. —THE END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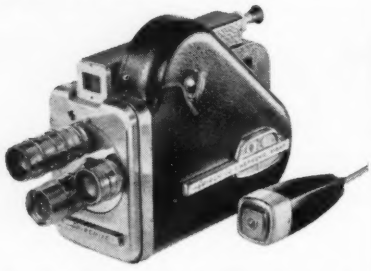

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FREE LITERATURE

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AUDIO-VISUAL

SL SELECTROSLIDES 201
Spindler & Sauppe. 4-page illustrated leaflet describes the SL-Series of Selectroslide projectors. Includes complete technical specifications.

CONTINUOUS PROJECTOR 202
Busch Film & Equipment Co. 4-page illustrated brochure describes the Cinesalesman portable continuous projector.

MITE-E-LITE PROJECTOR 203
DuKane Corp. Illustrated catalog sheet describes the Mite-E-Lite sound slidefilm projector. Includes specifications and prices.

3-D VIEWER 204
Stereo-Magniscope, Inc. Illustrated sheet describes the 3-D viewer for printed stereo photographs. Lists uses.

COLLAPSIBLE VIEWERS 205
Stereo-Magniscope, Inc. Illustrated sheet gives specifications and prices for filmstrip, 2 x 2 and 3-D slide viewers.

DARKO SHADES 206
Joanna Western Mills Co. 4-page illustrated brochure describes the Darko line of window shade equipment. Includes sample of materials available.

16MM SOUND MOVIE CATALOG
Swank Motion Pictures, Inc. 142-page catalog lists 16mm motion pictures available for rental including industrial, educational, religious and entertainment films. Request on letterhead from: Swank Motion Pictures, Inc., 621 N. Skinker Blvd., St. Louis, Mo.

CAMERA & LENS

LENS ACCESSORIES 208
Tiffen Optical Co. 64-page *Quick Reference Directory* lists lens accessories including neutral density filters, close-up lenses and facts about Photar filter glass.

EXAKTA CATALOG 209
Exakta Camera Co. 24-page catalog describes latest equipment available from Exakta giving optical and mechanical characteristics, applications and prices.

PRECISION OPTICS 210
J. D. Moeller Optical Corp. 16-page illustrated booklet describes the Moeller line of optical equipment including kolposcopes, ophthalmological instruments, surveying instruments, etc.

MULTIDATA SHUTTER 211
Flight Research Inc. Three-hole punched sheet describes the variable shutter for the 35mm Model IV-C Multidata camera. Includes complete specifications.

PHOTOGRAPHIC RECORDER 212
Benson-Lehner Corp. Illustrated catalog sheet describes the HS-16B photographic recorder. Includes specifications.

ZOOMAR TV LENSES 213
Zoomar, Inc. Illustrated catalog sheet describes the Zoomar TV lenses for image orthicon cameras. Includes specifications and prices.

PHOTAR FILTER GLASS 214
Tiffen Optical Co. 40-page book simplifies the selection and application of filters by its listing of detailed data on laminated glass, metallic neutral density, organic neutral density, dichroic, ultraviolet, infra-red and polarizing filters.

OSCILLOSCOPE CAMERA 215
Electronic Tube Corp. Illustrated catalog sheet describes the Model Sm-200A oscilloscope camera with Polaroid Land camera back. Includes specifications and prices.

MOTION ANALYSIS CAMERAS 216
Fairchild Camera and Instrument Corp. 8-page illustrated booklet describes the Fairchild line of motion analysis cameras and motors. Description of accessories.

EQUIPMENT

FILTER SYSTEMS 207
Sethco Mfg. Co. Bulletin contains complete technical description and prices of the "All-Epoxy" centrifugal filter systems designed for depth filtration of all common acid and alkaline aqueous solutions and solvents.

DUMONT EQUIPMENT 217
Allen B. Du Mont Laboratories, Inc. 12-page illustrated catalog describes the Du Mont oscilloscope record cameras and photographic accessories. Includes specifications and prices.

CAMERA HOUSING 218
Photo-Metric Instruments, Inc. 4-page illustrated folder describes the Sentinel radio controlled camera protective housing, Model PM-101 RC.

ROLLEI EQUIPMENT 219
Burleigh Brooks, Inc. 8-page booklet illustrates and describes the latest Rollei equipment. Accessories and prices.

REFLECTOMETER 220
W. M. Welch Scientific Co. Illustrated catalog sheet describes the Welch Densichron Model 2 Reflectometer. Includes specifications and prices.

"FLOATING ACTION" TRIPOD 221
Davis & Sanford Co. Illustrated leaflet describes the "floating action" tripod. Includes accessories, specifications.

MIXING VALVES 222
Simix Co., Inc. 4-page illustrated folder describes the thermostatic mixing valves for precision control of photo processing and laboratory work. Includes prices.

STUDIO LIGHTING 223
J. G. McAlister, Inc. Illustrated brochure describes controlled studio lamps and accessories. Includes specifications.

TRIPODS 224
Ries Camera Co., Inc. Illustrated catalog sheet describes the Tri-Lok tripods and heads. Includes price list for tripods and accessories.

EXPOSURE METER 225
Lektra Laboratories, Inc. Three-hole punched catalog sheet describes and illustrates the Densi-Lux enlarging exposure meter. Specifications and price.

PHOTO INSTRUMENTATION CATALOG
Camera Equipment Co., Inc. 90-page catalog illustrates and describes motion picture, television and photo instrumentation equipment and accessories. Request on letterhead from: Camera Equipment Co., Inc., 315 W. 43rd St., New York, N.Y.

PRIMOS ENLARGERS 226
Karl Heitz, Inc. Illustrated catalog sheet describes the Primos Autofocus and Testreflex enlargers. Includes specifications and prices.

ATC IMPULSE COUNTER 227
Automatic Timing & Controls, Inc. 4-page bulletin describes the Series 310 automatic reset impulse counter. Includes data on construction, application, specialized functions, etc.

LIGHTING CATALOG 228
Luxo Lamp Corp. 4-page lamp catalog describes and illustrates the Luxo line of incandescent, fluorescent, combination and magnifying lamps.

BURST AGITATION COMPONENTS 229
Bernalen, Inc. Illustrated catalog sheet gives complete specifications of the Bernalen line of burst agitation system components.

AVLITE VIEWERS 230
Macbeth Daylighting Corp. Illustrated folder describes and gives operating instructions for Macbeth Avlite standard viewers. Includes maintenance tips.

ROTARY DRYER 231
Charles Beseler Co. 4-page illustrated folder describes the Beseler automatic rotary dryer. Includes specifications.

COLORTRAN CONVERTER 232
Natural Lighting Corp. Illustrated catalog describes the Superior Jr. converter for copyboards up to 28 in. high.

PORTABLE LIGHTING SYSTEM 233
Forney Films. Illustrated catalog sheet describes the Cinetron IV heavy duty, portable lighting system for high level color film exposure. Includes specifications and prices.

MOTION PICTURES

TEL-ANIMASTAND 242
S.O.S. Cinema Supply Corp. 6-page illustrated brochure describes the Tel-Animastand animation and special effects stand. List of accessories and prices.

HIGH-SPEED MOVIE CAMERAS 243
Camera Equipment Co., Inc. 4-page illustrated folder describes the John H. Waddell rotating prism, high-speed motion picture cameras. Includes specifications, accessories and prices.

TITLING 244
S.O.S. Cinema Supply Corp. 4-page illustrated folder describes the Tel-Anima line of titler and special effects kits. Includes prices and specifications.

SPLICER 245
Camera Equipment Co., Inc. Three-hole punched catalog sheet gives specifications for the 16/35mm Firmsplice for use with 16 or 35mm magnetic tape or film. Includes prices.

PRESTO-SPLICER 246
Prestoseal Mfg. Corp. Illustrated catalog sheet describes the "Miracle Presto-Splicer" which uses the butt-weld method. Specifications and prices.

E-Z SPLICER 247
Bayliss & Whiteside. 6-page illustrated folder describes the Rowe Line Corp.'s professional E-Z splicer Model 8-16B.

8MM SYNC-SOUND 248
Fairchild Camera and Instrument Corp. 8-page illustrated leaflet describes the Fairchild Cinephonic 8mm sync-sound camera and recording projector. Includes accessories.

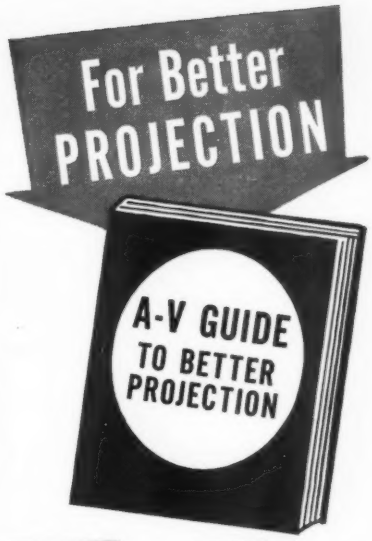
CONTINUOUS PROCESSOR 249
Milsco Mfg. Co. Illustrated catalog sheet describes the Cramer continuous processor for 16mm black-and-white, full reversal, regular negative and microfilm.

FILM SPROCKETS 250
La Vezzi Machine Works. 6-page illustrated brochure is designed to assist in selecting the stock sprocket for motion picture film which best meets your requirements. Includes prices.

FILM PROCESSORS 251
S.O.S. Cinema Supply Corp. Illustrated catalog sheet describes the Allen film processors—Models 200, 300 and 300M. Includes specifications and prices.

RENTAL CATALOG 253
Florman & Babb, Inc. 18-page catalog gives schedule of rental rates for professional motion picture production equipment and accessories.

FILM LIBRARY 254
Sherman Grinberg Film Libraries, Inc. Brochure lists subjects available to producers of motion pictures of all categories including Science and Medicine, War, Sports, Disasters, etc.



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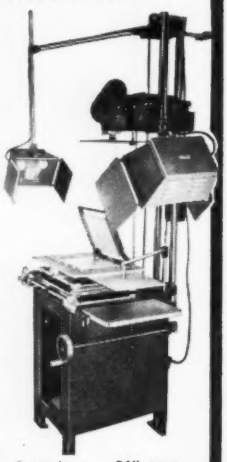

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GRAPHIC ARTS

NUARC CATALOG 237
nuArc Co., Inc. 6-page illustrated catalog describes the complete line of Jet line-up and stripping tables. Includes specifications.

CARBON ARCS 238
The Strong Electric Corp. Brochure tells in detail how to use carbon arcs for slide projection in industry. A table for establishing lens requirements is included.

CRONAFLEX DIRECT POSITIVE 239
Reproduction Engineering Corp. Information sheet describes the Blu-Ray proof printer method of exposing Cronaflex film, including the use of recommended lamps and developer.

POWDER SPRAY GUN 240
Press Filter Co. Illustrated folder describes the Ever-ready powder spray gun which is adaptable to any letterpress or offset press. Includes prices.

LUBRICATION CHART 241
Anchor Chemical Co., Inc. A lubrication chart, listing all major types of graphic arts equipment, their lubrication points and the proper lubricant to be used.

SERVICES

COLOR LABORATORY 255
Kurt Mayer Color Laboratories, Inc. Sheet gives prices from this New York lab for Printon prints, Ektacolor (Type C) prints and duplicate transparencies.

SOUND SERVICE STUDIO 256
Byron, Inc. 4-page illustrated reprint from the *Journal of the Society of Motion Picture and Television Engineers*, "An Integrated Sound Service Studio for the 16mm Producer."

PHOTOGRAPHIC REPROS 257
Business Photos Co. Schedule gives prices for black-and-white prints, in lots of 10, 25, 100, 500 and 1000. Also gives prices for copy negatives.

RENTAL PRICE LIST 258
Camera Equipment Co., Inc. 12-page booklet gives rental rates for motion picture production editing equipment.

DYE TRANSFER COLOR PRINTS 259
Graphic Services Inc. Price schedule gives rates from this California firm for dye transfer color prints made from color negatives or positive transparencies.

ENGINEERING TEXTS 261
John F. Rider Publisher, Inc. 4-page catalog lists engineering texts available from this publisher.

ANSCO DATA SHEET 262
Ansco. Photographic data sheet gives complete specifications on Super Anscochrome PNI 16, 35 and 70mm film. Includes processing information.

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NEW PRODUCTS

For additional information on any new product circle the appropriate number on the readers' service card, page 73.

ALUMINUM BOTTLES **124**
Twenty-eight assorted stock sizes and shapes of Seamless Aluminum Bottles for packing, shipping and storing chemicals are available from the American Aluminum Co. According to the manufacturer, they will prevent breakage, and are lightproof, leakproof and rustproof.

AGFA OPTIMA REFLEX **105**
The Agfa Optima Reflex, which is said to automatically set both the correct shutter speed and lens opening for the prevailing light conditions and type of film used, has been announced by Agfa, Inc. The camera provides for film speeds ranging from ASA 10 to 250, and has two identical lenses for viewing and taking—the Agfa Color-Apotar f/2.8 45mm.

MOTION ANALYZER **101**
The ServiShops Motion Analyzer, which can demonstrate and test any function of still or motion picture equipment, has been announced by the National Camera Repair School.

CAMERA-PROCESSOR **102**
A Camera-Processor-Viewer, developed by Optomechanisms, Inc., will photograph, process and display a 35mm picture in 4 sec. according to the manufacturer. Weighing about 40 lbs., it features a camera with an f/2.5 lens of 0.7-in. focal length, a controlled high energy developing system, a combination washing and projection cell for image display, and a forced hot air drying unit designed for pulse operation. Pictures can be shown on a built-in rear projection screen or on a wall screen. In addition to the picture, data is also photographed on each frame of the film. The data package within the unit contains a patented 24-hr. clock with sweep second hand, a 4-digit frame counter, a data card and six indicator lights.

INTERFEROMETER **125**
The Schardin-Mach-Zehnder Interferometer, for applications of interferometric, schlieren and shadow methods of photography in many areas of research has been announced by Zoomar, Inc.

INSPECT-O-FILM **126**
New features for the Inspecto-O-Film Model U machine, which inspects, edits and cleans motion picture film, have been announced by the Harwald Co. They include a new speed control and braking system, a 546-sq.-in. work surface, additional room for film cans and splicer, and front-loading 2000-ft. leader feeds. A counter calibrated in minutes and seconds instead of in feet is a new feature.

(continued on page 78)

MPDFA

A report on the new products shown at the MPDFA Convention in Philadelphia begins on the following page. For more information about these items, Readers' Service numbers are listed on page 82 and may be checked off on the card opposite this page.

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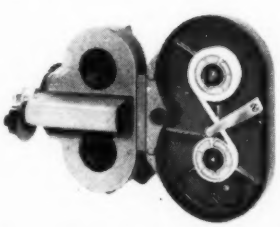
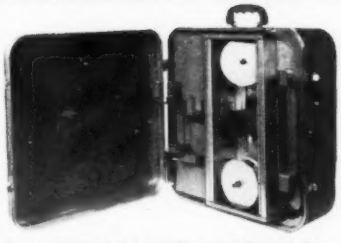
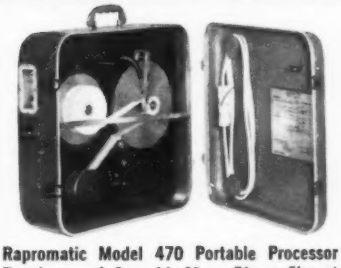
LAB 1-using standard cameras...



Rapromatic Magazine with Standard Camera
Magazine processor adapts any 16, 35 or 70mm cine camera to develop and fix film as you shoot. Spring loaded roller is only modification needed on standard magazines.



Rapromatic Model 410 Portable Washer-Dryer
Companion unit for magazine processor or portable processor. Weighs only 30 pounds, operate from normal house current. Static wash-dry speeds adjustable up to 25 ft./min.



Rapromatic Model 470 Portable Processor
Develops and fixes 16, 35 or 70mm film at speeds up to 50 feet per minute. Weighs only 30 pounds, accommodates reels up to 400 feet. Motor drive, hand crank for field use.

LAB 2-using Rapromatic magazine

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Get more information. Circle 479, page 73

MPDFA

This year's show at Philadelphia includes more sensitive exposure meters, some new equipment and a breathing space for photographic trend setters

Every spring brings to an eager world, along with crocusses (or is it crocci?) and assorted mating urges, the newest in photo equipment at the annual Master Photo Dealers and Finishers (MPDFA) show. Here, proud parents of photographic hardware offspring present their children, making an official debut to an anxious but critical audience. In the audience, along with other assorted editors, dealers, PR men and just plain camera bugs, was the PMI eye, waiting to see what debutante is fated to blush unseen in the back of an in-plant lab rather than make a big impression at the camera counter as this year's most oomphiest piece of equipment.

While there was no outstanding trend to match last year's 8mm sound breakthrough, several important currents could be discerned. First was the introduction of rapid processing printers and, its long-awaited cousin, Polaroid's P/N (positive-negative) process giving both a print and a negative in just a shade over nothing flat.

Secondly, the cadmium-sulfide exposure meters, first shown at Photokina, made their appearance here with models from both Germany and Japan. These meters promise new highs in the ability to read low light levels.

Third trend to impress us was the introduction of the Linhof 70mm system. The back itself was not new but here is a complete system, from bulk loader to developing tank, using 70mm film.

Other big news was, of course, Kodachrome II, a pepped up version of the old pro with an E.I. of 25 and improvements all around (*see March* PMI, *p. 42*).

As if to illustrate the advantages of the competitive, free-enterprise system, the Sylvania Sun-Gun, a pretty good unit, now has competition from GE and Westinghouse. Both firms introduced sealed-beam lighting units which also pack many lumens.

Two new cameras of interest made their debuts. One was a new Bronica, slightly remodeled to look less like that Swedish brand X (to misapply one of Bob Schwalberg's phrases). However, it is neat, trim and has virtually all of the features of the original Bronica at a $399.50 price. This is $90 less than its older brother (or sister, depending upon whether or not you favor women suffrage). The lens is a 75mm f/2.8 Nikkor, focal plane shutter has speeds of 1 to 1/1000 second and the backs seem somewhat more jam-proof than on the original model. Both models have accessories in common but the backs cannot be used on both models. Each camera takes its own back only.

The Rollei people came out with a wide-angle Rolleiflex covering 71 degrees with its 55mm f/4 Zeiss Distagon lens. It is of a special design since the camera has the same depth as the standard Rollei with a 75mm lens. A lens in the hood permits eye-level work. The price is $399.50.

New Bronica lists for $90 less.

Several view cameras were shown for the first time, although they are not brand new items. Standard Camera has the Arca (Swiss) line, view cameras and a single-lens reflex with an amazing set of combinations and permutations. Sizes range from 2¼ x 3¼ to 5 x 7. Prices and delivery dates have not yet been fixed. Burleigh Brooks is handling the Dutch Favero line, 4 x 5 to 8 x 10.

Yashica, showed an interesting No. 120 360-degree camera. No details on delivery were available. Price, with an 82mm f/3.5 lens will be about $300. It is a panoramic camera rather than an extreme wide-angle camera such as the Nikon Fish-Eye, introduced several seasons back.

For people who want to take a lot of pictures in a hurry, the $150 Graflex Jet 35mm camera might be just the thing. Pellets of carbon dioxide are used to power a rapid advance motor clicking off frames at about two per second. The lens is an f/2, in a between-the-lens 1/500th shutter.

From the viewpoint of the greatest possible future significance to professional camera design, the 70mm system displayed by Linhof deserves consideration. The back itself was shown at Photokina but there is now a complete set of accessories including developing tank to handle the 70mm film. For many photographers, 70mm film (which is like large 35mm) offers needed advantages such as ease of transport (using sprocket drives), precise position-

ing at the focal plane and 53 exposures per load. The backs are available for either 4 x 5 or 2¼ x 3¼ cameras. Linhof put a 70mm back at the rear of a press camera body and a 65mm f/6.8 Angulon lens at the front, to come up with a very attractive wide-angle camera. (Our private pet scheme is a 2¼ x 2¼ reflex for 70mm film.)

The one trend which seeped into our minds, muddled by the rich food and drink supplied by the ubiquitous refreshment stands (orange flavored water and crispy egg salad), was the development of battery-powered cadmium sulfide exposure meters. Gossen introduced its Lunasix meter, undoubtedly the most sensitive photo-electric exposure meter (actually its photo-electronic) ever, while Sekonic showed its cad-sulfide Microlite L-88. The difference in sensitivity range is reflected in the prices, the Gossen selling for about $60, the Sekonic about $25.

For those who really want to take exposure readings from a small area, there is the Heiland Pentax meter. Looking like a tiny Graflex (the reflex kind, not the jet-age breed), it reads a spot that covers an angle of three degrees within a 21-degree angle of view. Price will be about $80. This type of meter permits highly accurate readings from great distances, as well as eliminating mental calculations when reading backlighted subjects, for example, with a standard meter.

Another trend is the swing toward rapid processing for the amateur and working photographer exemplified by the Polaroid P/N film which produces a 4 x 5 print and negative in a Polaroid Land 500 Film Holder (covered in David B. Eisendrath, Jr.'s March column page 16), the Rollaprint of U. S. Photo Supply and Geiss-America's Fotorite.

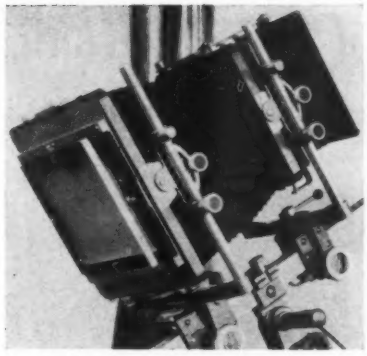
The Rollaprint turns out contact prints up to 3¼ x 4¼ without a darkroom in about ten seconds. Two chemicals, a developer and a stabilizer, are used in a special processor. One side contains the print frame where the picture is exposed. The other side contains the processing assembly where the print is slipped between rollers into the chemicals to make the transition from an exposed sheet of paper to a developed, quick drying print. List price, $19.95.

A just-announced accessory for the Rollaprint consists of a fixed-focus enlarger assembly accepting 35mm negatives and capable of turning out 3¼ x 4¼ enlargements. It uses contact speed Rollaprint paper. A high-speed enlarging paper is expected soon. It will provide shorter exposure, but require subdued lighting. List on this unit is about $37.50.

The Geiss-America offering, the Fotorite, is somewhat more elaborate using motor drive. However, the basic principle appears to be similar including the use of a activator and stabilizer combination. Taking prints up to 11 x 14 in., the processing cycle is about 15 seconds. Contact prints can be made under normal room light but enlargements must be exposed and processed in a darkroom. The price of this unit is about $160.

An interesting item in the Heiland stable but without price or availability is a set of accessory lenses for the Futuramic flash units. There are four lenses, a wide-angle, a neutral density lens (to cut light output in close-up work), a bounce light diffuser and a color correcting lens for Kodacolor (to bring the output to the proper color temperature).

Nikon unveiled some tempting items for their cameras including a radio controlled motor and repeating electronic flash unit. The



Dutch-made Favero camera.

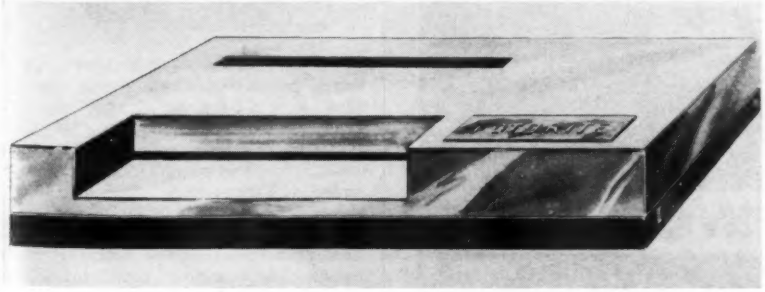
radio can operate the motor from about 500 yards away, shooting approximately three frames per second. The repeating electronic flash unit has a (dé) Kodachrome guide number of 35. No price or delivery data yet. There is a $169 price tag on a 55mm Micro Nikkor lens with a focusing range from 2 in. to infinity. At the opposite extreme is a 500mm f/4 mirro-optics telephoto lens for about $450. And in between is an f/4 200mm zoom lens with automatic diaphragm and a light-weight mount. No price here.

At the other stand, E. Leitz presented a 280mm f/4.8 Telyt, said to have better sharpness and color correction, than previously thought possible with tele systems. There is also a wide-angle slide projector and a low-voltage system for slide projectors. In this system, a 12-volt lamp is made to do the work of 300 volts. Big advantage, according to Leitz is greater depth of focus, permitting sharper images in the face of slide's heat popping, due to the shorter focal length of the lens.

While on projectors . . . Rollei offers an adaptor to make any Rollei with a removable hood a table-top projector for 2 x 2 or 2¼ x 2¼ slides. In use, the hood of the camera is removed, the camera is placed over the top of the projector upside down (the ground glass resting on the projector) and the light being transmitted through the viewing system of the camera. Price will be about $50.

Incidentally, prices on German products will probably go up slightly (about 5 per cent or less) due to revaluation of the mark from 4.80 DM to the dollar (about 21¢ per

(*continued on page* 82)



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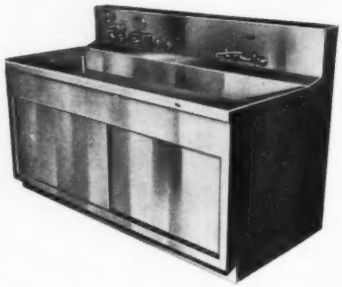

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MAP-O-GRAPH **103**

Art-O-Graph, Inc., claims that the preparation of maps and charts can be speeded up and simplified with its automatic Model 55 Map-O-Graph vertical opaque projector. Handling maps of any size, the Map-O-Graph enlarges or reduces an 11 x 11-in. section up to 5 times, projecting it directly on a drawing board. It has a Buhl 9½-in., f/4.5, 4-element Tessar-type coated lens and lighting is with 4 No. 212 enlarger lamps.

BENSON-LEHNER CAMERA **106**

Benson-Lehner has announced a 400-ft. film capacity model of its HS16C high-speed intermittent camera. Incorporated in both the 400-ft. and 200-ft. models are an automatic film footage indicator, a larger demand brake for the film feed spool and a midrib construction that enables the film transport mechanism to be removed from the camera housing as a unit. Other features and accessories of the HS16C have been retained.

TESSAR 50 MM F/2.8 **107**

Exakta Camera Co. has introduced a new automatic Zeiss lens—the Tessar 50mm f/2.8—which is said to be nearly half the size of other normal focal length lenses. The lens remains open at f/2.8 for focusing and composing at full aperture, and when the release button is pressed closes down to the preselected aperture as the picture is taken. The focusing mount has a dual scale with calibrations in feet and meters with a range from infinity down to 1.7 ft. Price: $60.

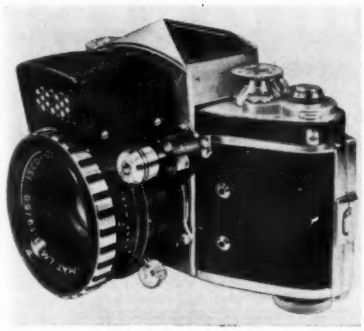
HERSHEY SUN RING **108**

Said to deliver 10 to 12 times more illumination than any other "ring-type" light, the Sun Ring is a new product of the Hershey Mfg. Co. It can be used with any single-lens reflex, Polaroid, press, or studio camera (up to Series VII filter) and adapts to most power packs up to

200WS. It carries its own power supply which provides separate power settings (full, ½ or ¼) for varied light intensity. Prices: with cord and connector with P.C. shutter cord attached—$39.95; with 100WS power supply, battery or AC operated (batteries extra)—$59.95.

INTERNEGATIVE PRINTER **129**

Two new models of the Emby-Homrich internegative printer have been announced by the Sickles Sales and Service Co. They feature interchangeable magazines for 35mm and 46mm (127 film).



ISCO-MAT 50MM LENS **104**
The f/1.9 Isco-Mat LM 50mm lens is the first of a new series of electric-eye lenses for the Exakta to be produced by the Isco Optical Works. It can be used as a photo-electric exposure meter lens or as a conventional lens with the meter detached. It has eight diaphragm stops from f/1.9 to f/22 and focuses from infinity down to 20 in. The lens renders a 45-degree angle of view. Price: $150.

TRIPODS AND UNIPODS **123**
An automatic tripod and two unipods are new products of the Smith-Victor Corp. The automatic tripod, Model TP-4, features a pan head with 90° tilt and weighs 2¼ lbs. It opens to 65 in. and closes down to 25 in. automatically when held upside down. Price: $14.95. The Model TP-5 unipod, weighing 12 oz., extends to 64 in. and closes to 25 in. It can hold 20 lbs. Price: $4.95. The automatic Tote'Em Pole Model TP-2 opens to 63 in. and closes automatically to 25 in. It weighs 1½ lbs. and can hold 40 lbs., according to the manufacturer. Price: $9.95.

BRONICA ACCESSORIES **127**
Caprod, Ltd., has announced four new accessories for the Bronica: a pentaprism viewfinder for eye level viewing, $69.95; a Nikkor telephoto lens adapter, designed to fit all shortmount 35mm Nikkor lenses from 180mm to 1000mm, $55; a blank adapter designed to take telephotos of any manufacturer, $42.50 and a semi-automatic four-section extension tube for close-up work, $60.

PAPER SHREDDER **111**
Easy destruction of unwanted office papers is provided by the Michael Lith Sales Corp.'s "Destroyit," a paper shredder that can handle up to 8 sheets of bond paper at one time. It is claimed that paper clips and fasteners will not hurt the mechanism, which is powered by a 110 AC motor. The "Destroyit" measures about 34 x 17 x 15 and weighs 71 lbs.

PROCESS COLOR CAMERA **112**
J. G. Saltzman, Inc., has announced the Caesar-Saltzman Precision Process Color Camera for photomechanical reproduction. It features the Ascorlux Pulsed Xenon Arc light source with constant color-balanced white light. The camera handles reflection copy from 40 x 50 in. to 8 x 10 in., reductions to 35mm, separation enlargements from 35mm, and halftones up to 20 x 24 in.

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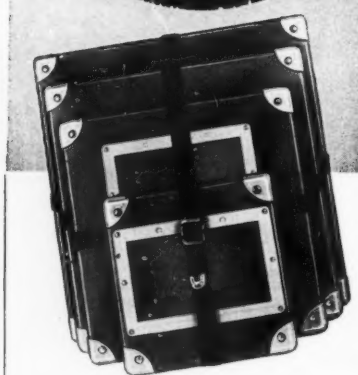

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GOSSEN-LUNASIX METER 109
The Gossen-Lunasix electronic exposure meter, said to be 256 times, or 8 full lens stops, more responsive than conventional meters, has been introduced by Kling Photo Corp. Readings can be preset for

film exposure indexes from ASA 6 to 12,000, or 1° to 12° under the new system. Exposure times from 1/4000 sec. to 8 hours can be read directly from the dial for lens openings from f/1 to f/90. Price: about $60.

KODACHROME II PROCESSOR 110
The Arriflex Corp. has introduced a Duplex Processing machine which permits simultaneous processing of both 35mm and 16mm (double 8mm) new type Kodachrome II in a common tank system. Separate drive and rack systems permit either film size to be developed simultaneously or separately. It has an output of either 90 ft. per min. for 16mm and 12 ft. per min. for 35mm; or 70 ft. per min. for 16mm and 17.5 ft. per min. for 35mm.

TRI-X PAN IN FILM PACKS
Improved Kodak Tri-X Pan film, introduced last year in rolls, is now available in 4 x 5 in. film packs, according to the Eastman Kodak Co.

FORNEY CINETRON IV 117
A heavy-duty, portable lighting system calibrated to give "best results" for high level color film exposure is the Forney Cinetron IV, a new product of Forney Industries, Inc. Its features include an input voltmeter, a breaker on the input and ouptut, and six outlets equipped with color temperature selectors. Prices: 230V—$539; 460V—$639.

AUTO-COLLIMATOR 118
The National Camera Repair School has announced the ServiShops Auto-Collimator which can check focus of all types of cameras from fixed-focus to full-focusing in 8 sec., with or wtihout film.

E-Z SPLICER 119
The E-Z Model 8-16 B Film Splicer, featuring a tape splice that ends on film frame lines and that is curved for minimum interference with the picture area, is a new product of Rowe Line Corp. Prices: Splicer—$39.95; 120 E-Z Tab tape splices—$1.75.

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Get more information. Circle 420, page 73

AFCO FILTER CARTRIDGE **120**
The AFCO Feutron Filter Cartridge made of custom-manufactured synthetic fiber felts of controlled denier and a stainless steel core, has been introduced by the American Felt Co. Used by photo processors in their production lines, it reportedly clears developer of emulsion particles and lengthens the life of pumps.

WIRELESS SLIDE PROJECTOR **121**
What is claimed to be the first slide projector to use ultrasonic sound waves to focus and change slides by wireless remote control has been introduced by Bell & Howell Co. The remote control on the 764W Tele-Sonic Explorer Wireless Slide Projector has two miniature transmitters, one sending high frequency waves at 36,500 cycles per sec. for focusing; the other at 40,000 cycles to change or advance slides. The projector features a "Look'n Load" device to insure that slides will be shown right side up, and a black-out shutter which cuts the light between slides. It takes Bantam, 35mm or Super Slides, 40 to a tray, and permits inter-mixing of all three sizes. Price: $269.95.

TWO LITHO FILMS **122**
Chemco Photoproducts Co., Inc., has introduced two new Powerline films, called Powerline Acetate Film and Powerline Polystyrene Film, consisting of a high contrast emulsion coated on either low cost (.0035-in.) acetate or dimensionally stable Polystyrene. They are available in a wide range of cut sheets and rolls and can provide savings of as much as 47 per cent, the manufacturer claims.

SLIDE MOUNT **510**
A slide mount with an aperture of 30 x 30mm for unperforated 35mm film has been manufactured by Seary-Michelbach Corp. for mounting reduced duplicates of superslides (127 film).

FLIP-TOP PLATEMAKER **115**
The FT-40 Flip-Top Platemaker, designed for all plates up to 30 x 40 in. in size, has been developed by the nuArc Co., Inc. It features an automatic timer

to eliminate all manual settings and adjustments, and is available with automatic or motor-driven arc lamps. Prices: FT-40 M. with motor-driven arc lamp—$945; FT-40, with automatic arc lamp—$795.

(continued on page 83)

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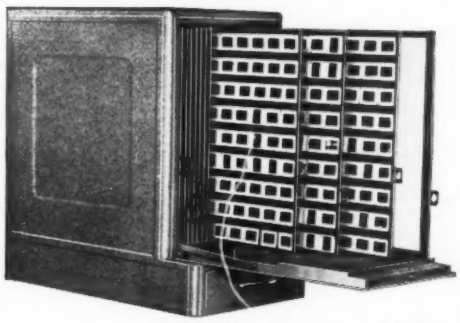

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(*continued from page 77*)

mark) to 4 DM to the dollar (25¢ per mark). Thus, a camera costing 100 marks in Germany will go up from $21 to $25. Blame this on the vicissitudes of international trade and the balance of payments.

Durst unveiled a new 8 x 10 in. enlarger, the 184. There are two models, the V-184 for standard photographic use and the GR-184 with facilities for precise registration needed by graphic arts labs. This unit is a condenser-type enlarger with filter drawers in the lamphouse accepting 12-in. square filters. Delivery will be in late summer with an approximate price of $2500 for the V-184.

Voss Photo, importers of Kindermann products, showed a new small color print processor, the Econo-Lab. Designed for prints to 16 x 20 in., the unit includes nitrogen burst agitation and a thermometer-controlled mixing valve. Made of enamel-baked steel, the unit will sell for about $2200.

At the Brothers Simmon, the new Omega Microfilm Enlarger was displayed for 16mm, 35mm and 70mm microfilm negatives. In manual and autofocusing models, there is a point source of light using a 20V clear bulb. The light intensity is changed by means of the power pack control, rather than adjusting the lens diaphragm. This unit is available as a lamphouse-power pack assembly for D2 and D3 enlargers at $225 and as a complete enlarger with prices beginning at $401.

One of the more interesting items was Elgeet's closed-circuit microscope television system. A television camera is hooked up to an Elgeet microscope and the image on the slide projected over a closed circuit hook-up. This unit begins at about $1450 for microscope and TV equipment.

Two offerings of interest flying the Ansco colors are VeeCee variable contrast projection paper and Anscochrome Duplicating Film. The VeeCee paper is a medium speed, warm-tone paper similar to Cykora. This paper is said to work equally well with the duPont ten-filter (Varigam) system or the Eastman seven-filter (Polycontrast) system. Although VeeCee has a processing latitude from one to three minutes, optimum processing time is 1½ min. Use with a 212 or similar bulb rather than cold-light illumination. Recommended developer is Vividol.

Anscochrome Duplicating Film has low contrast and is specifically designed for duplicating color transparencies. It can be processed in regular Anscochrome processing chemicals and is available in 35mm, 70mm and sheet form.

Even though we are running out of space, there is one item which caught our fancy, the Roloc slide viewer. Built of translucent plastic around a flourescent tube, it provides a handy method of judging transparencies by a uniform light. If you've ever wondered why the color slide which looked great on your viewer was turned down by management looking at it over a reddish light bulb, you'll realize that the light source can make or break a color shot. For about $10, everyone can use a standard slide viewer like this. One catch: no delivery or distribution yet.

Space does not permit a more detailed account of this year's camera cotillion. We will have to leave many debutantes unmentioned, in this chivalrous but hardly comprehensive coverage. Future issues, however, will contain detailed stories on many of these mentionable items. —THE END

NEW PRODUCTS AT MPDFA

For more information about the new products mentioned in this story, circle the appropriate number on the readers' service card, page 73.

Bronica camera	512	Arca cameras	519	Heiland Pentax meter	525
Durst enlarger	513	Favero cameras	520	Polaroid P/N film	526
Econo-Lab processor	514	Yashica 360 camera	521	Rollaprint	527
Omega microfilm enlarger	515	Graflex Jet	522	Fotorite	528
Elgeet microscope TV	516	Linhof 70mm	523	Futuramic flash	529
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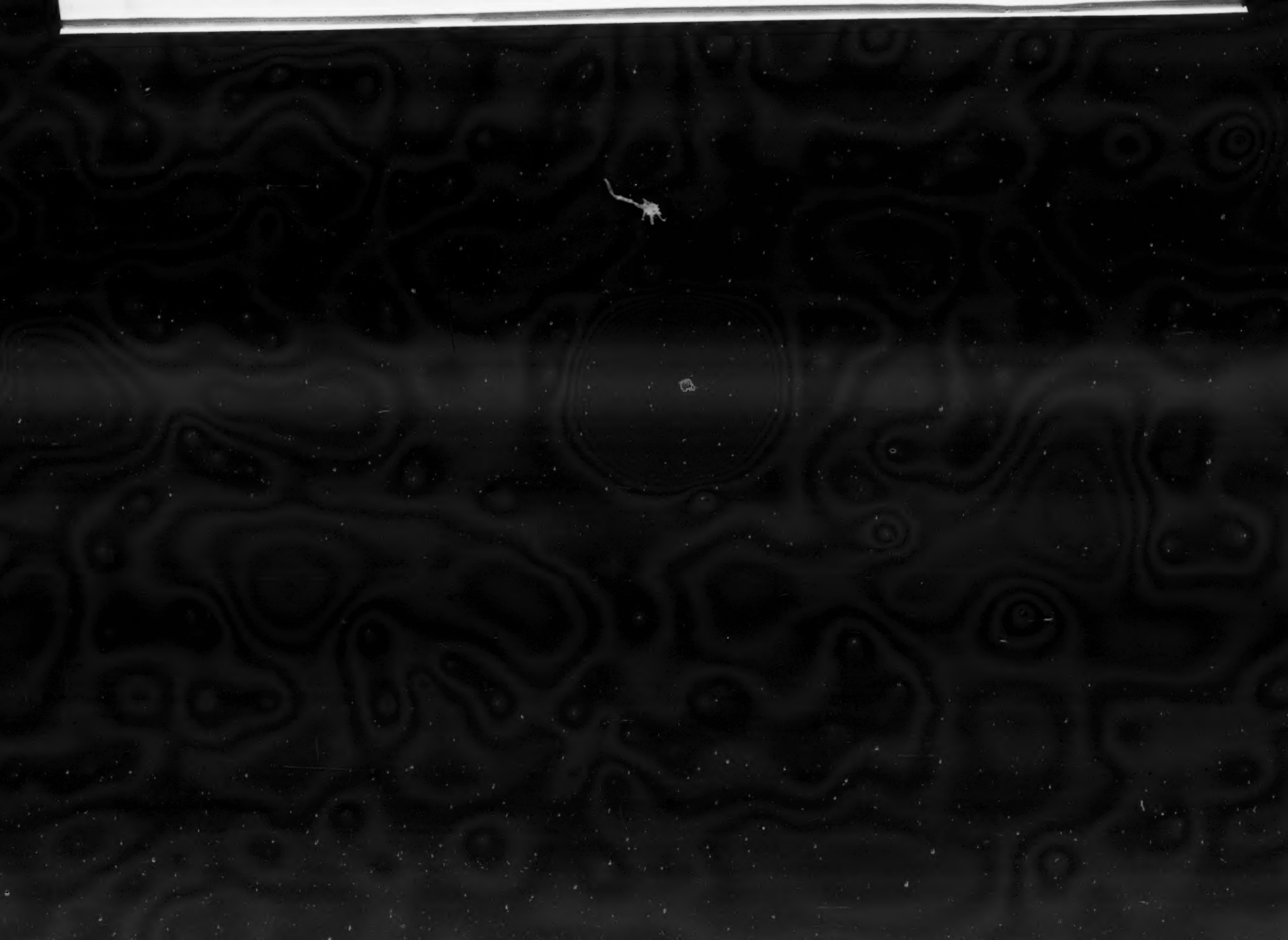
Rolleiflex wide-angle	518	Sekonic Microlite L-88	524	Leitz Telyt	531
				Rollei adaptor	532
				VeeCee paper	533
				Anscochrome Film	534



NEW PRODUCTS

(*continued from page* 81)

INTERLOCK SYSTEM **128**

A storage system that protects engineering drawings and blueprints from needless wear through excessive handling, and provides simplified filing and easy acces-

sibility, is the claim made for the Interlock System developed by Pack Mfg. Co. Each file is comprised of a fiberboard tube which is housed in a square fiberboard box. A metal end, which interlocks, eliminates the need for supporting racks or frames.

MINIATURE ELECTRIC PUMP **113**

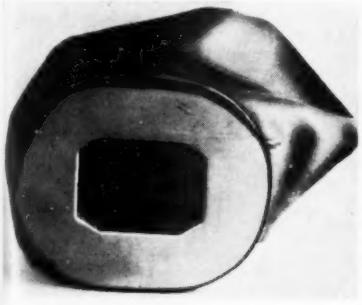
Said to standardize darkroom technique in developing and printing photos, a Miniature Electric Pump is now available for keeping agitation constant in developer, hypo, fixer, or rinse. Manufactured by the Edmund Scientific Co., the pump is battery-operated. Price: $3.98.

ANALYSIS PROJECTOR **114**

The K-161CW Analysis Projector, produced by the Lafayette Instrument Co., can inject one frame at a time, and run forward and backward at variable speeds. It features a frame counter which reads in either direction, and has a continuous blower system that permits use of a 500W lamp. A front-view screen is available for daylight viewing. Prices: projector—$390; screen—$120.

UNDERWATER CAMERA CASE **511**

A Camera Case Kit for underwater photography is being offered by the Edmund Scientific Co. It consists of a rubber bladder to enclose the camera, heavy bands for attaching bladder to faceplate, and a window of optical glass with a waterproof sealant. Price: $4.75.



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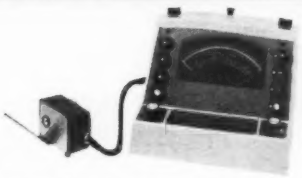

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PHOTO BOOKS IN REVIEW

PHOTOGRAPHIC CHEMISTRY, Volume 2 (Color). Pierre Glafkides. *Translated from the French by Keith M. Hornsby, F.R.P.S. Fountain Press, London. Distributed in the U.S.A., by the MacMillan Co., New York. 6 x 10, 505 pages. $21.*

Photographic Chemistry is a two volume work which, despite the title's implication of a specific and specialized subject, actually embraces many allied fields. The author's main theme is, of course, the chemistry of the photographic processes, but so thoroughly does he cover related subjects that the title may be considered a misnomer. The blending of theory and practice, the detailed treatment of related sciences and technology, and the wealth of references to original papers and patents make either volume an extremely comprehensive and authoritative source of information. Volume 1, which was published earlier, deals with the formation and development of the image in black-and-white photography.

Volume 2, just released, is concerned with colored images. This embraces color separation photography, multilayer color materials, and the full gamut of color forming and color reproduction systems. Starting out with a discussion of light sources and the theory of color reproduction, the chapters that follow cover in detail a vast number of color systems—additive and subtractive, past and present. Most of the color films and print systems currently in use are discussed in detail in the chapter on color development. Such familiar processes as dye transfer, Flexichrome, Pinatype, etc., are treated in the chapter devoted to the processes involving the dyeing of gelatin images. Another chapter is concerned with the formation of colored images by such diverse systems as color coupling, mordanting and toning. The section covering the formation and destruction of dyes by purely photo-chemical effects (bleaching, oxidation and coupling) includes the various systems employing diazo dyes.

The graphic arts are not overlooked. A chapter on images pro-

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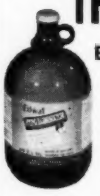

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Get more information. Circle 491, page 73

duced by means of light sensitive colloids includes mention of the photomechanical platemaking methods—photoengraving, photogravure, collotype, silkscreen and photolithography. Photoceramics, the carbo and carbon processes, and gum-bichromate printing, are also mentioned in this section.

The remainder of the text is concerned with the theory and technology of color sensitization and deals primarily with the dyes used to produce specific spectral sensitivity in photographic emulsions. The opposite effect, desensitization, is treated in depth in the concluding chapter. Finally, a 50-page appendix provides a wealth of theoretical and practical data on chemical principles.

This brief review can do no more than provide an insight to the contents of a rather thorough and definitive treatment of the chemistry of color photography. The author has provided 17 chapters and probably some 200,000 words to cover his subject. Obviously, between the pages of this volume there is a lot of information of value and interest to both the experienced worker and advanced students.

Herbert P. Paschel

ELECTRONIC FLASH

(*continued from page 24*)

operation, then alternatives include using a relay to disconnect the charging circuit from the capacitor bank immediately after discharge; using a series tube such as a connectron (see *GE Flash Tube Manual*) or hydrogen thyratron to control the discharge; or for low energy discharges, an inductance in series with the discharge.

Many complaints reach my ears about the high cost of repairs of certain makes of electronic flash units, or of parts, if they have to be ordered from the manufacturer.

If you do your own, even limited service, (such as replacing capacitors) be sure to get catalogs from the leading electronic supply houses or those in your own area. Many stock standard parts for electronic flash units and prices are uniform and fair.

If your units are five or more years old, it may pay you to watch the want ads in the local newspaper and local photo shops for used equipment of identical make. Many times a complete unit in operating condition will be far cheaper than a repair, and the units may later be completely cannibalized to keep original equipment going.—THE END

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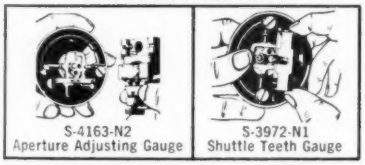

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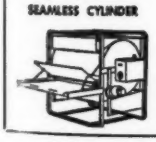

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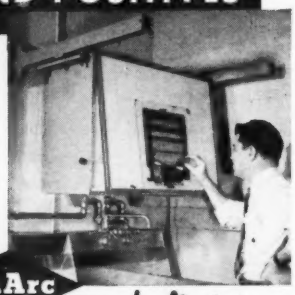

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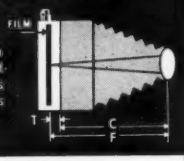

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VACUUM-PACKED MOVIES

(*continued from page 64*)

rence of the failure. This necessitated turning the camera off outside the chamber in later shooting.

"The Bolex film (ECO) was rushed through to processing with warning notes about brittleness, and showed the event very well. No pictorial or chemical differences from normally exposed film were noticed.

"Once more, the cameras, lights and test specimen were placed in the vacuum chamber, and after another 48 hours of evacuating, a second test was run. This time both cameras operated successfully and the film was rushed through processing with the warning of brittleness repeated. Both the Fastax and Bolex film showed good pictures of the event. The film seemed brittle after processing, so prints were ordered immediately after viewing.

"Rate of film travel through the camera was less than calculated due to film curl. The high-speed timing pips showed the film was recording 840 fps at event time, when at the voltage applied, it should have been going about 1000 fps. Without accurate calculations, it was assumed that the Bolex film had also been slowed down.

"As far as damage to cameras is concerned, the Fastax apparently has suffered none. It had been lubricated before each test and run for a minute or so to work the oil into the bearings. The Bolex seemed affected by lack of lubricant and a weakened spring.

"In retrospect, it seems it might be more advisable to construct an airtight camera chamber to preserve normal atmospheric pressure environment for cameras and film. In our case, time was the important item due to engineering deadlines, and the success of the operation more than compensated for the slight damage to the Bolex." —END

73

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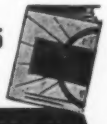

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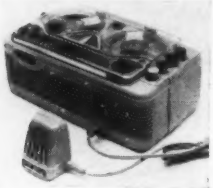

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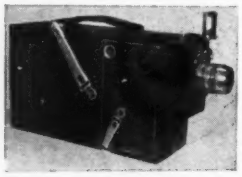

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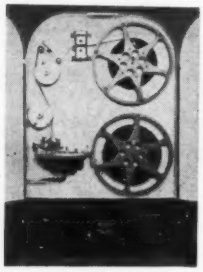

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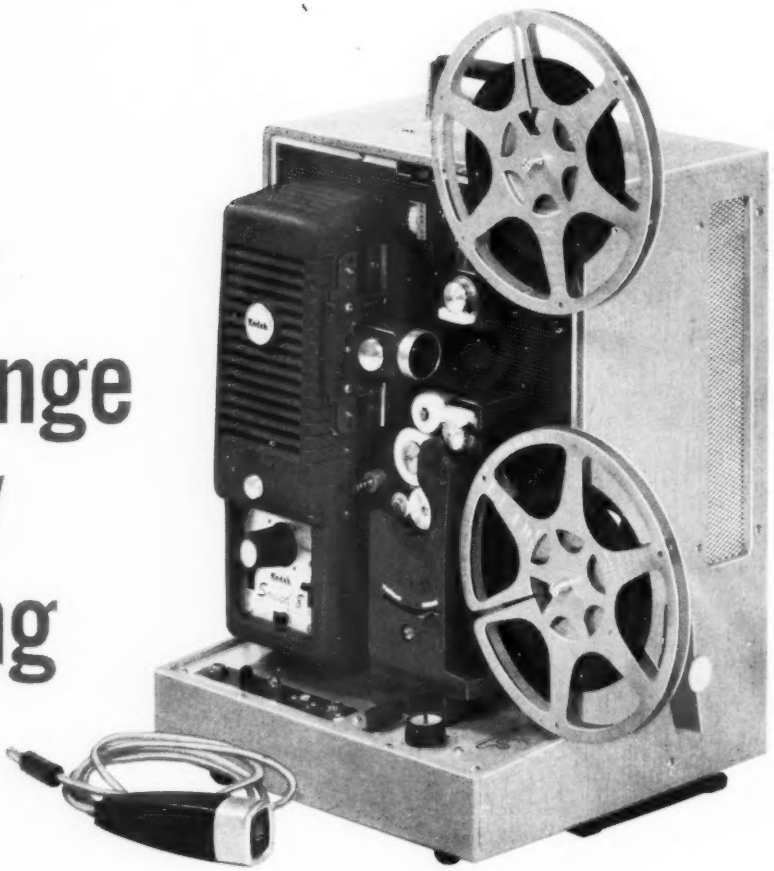
TRADEMARK

This projector may change your way of working



The 8mm motion picture switched from an amateur's hobby to a professional's tool when this Kodak Sound 8 Projector was introduced. It may well change the way you do *your* work.

For here is a projector that makes it possible to present your own 8mm in-plant movies with your own magnetic sound, at a new, low cost.

This machine brings you sound and picture quality comparable with much 16mm, enabling you to make and show good color-sound movies with savings only 8mm equipment and materials can provide.

Speaker, microphone, and the projector itself are all included in the case. You can set it up and thread it in seconds. It has two forward speeds (16 and 24 frames per second), rapid rewind and shows "still" frames.

You can record voice and music (or sound effects on tape) separately or together, using the Kodak Sound 8 Projector. You can record, erase, re-record any time and as many times as you like. The result—you can tailor sound motion pictures to individual audiences.

Cost: less than $350.

Price is subject to change without notice.

Ask your Kodak dealer for a demonstration.

EASTMAN KODAK COMPANY, Rochester 4, N. Y.